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Propulsion Physics and Rocket Launching Hazards*

Near-Field Launching Hazards Incident to Shipboard Missile Operations

LIEUTENANT COMMANDER H. DAVID BALDRIDGE, JR., MSC, U. S. Navy**

THE Rocket Age has given rise to new weapons systems which have greatly increased the defensive and offensive capabilities of the Navy. These increased capabilities, however, have not been without their price in the form of personnel hazards and, in some cases, are limited by the capacity of the human crew to live and function in the environment created by the presence and/or operation of the weapon system. The hazards associated with Navy shipboard missile systems are in general the results of a situation which at present is peculiar to the Navy, namely the situation where a crew of over 1,000 men live and work aboard the launching pad. In discussing shipboard launching hazards, it should be noted that a heavy cruiser is only 650-700 feet long, and the full utilization of the defensive capabilities of such a ship requires the manning of top-side positions within 100-125 feet of the missile launchers. A typical guided missile cruiser is shown in Figure 1.

The personnel hazards of concern aboard operational surface ships are of four general types; blast pressures, temperature and flash-burn hazards, high intensity noise, and noxious gases. These have been termed "near-field" launching hazards since their effects are of concern primarily to personnel who must remain in close proximity to the launchers during rocket firings. The ground forces are able to avoid these problems to some extent by relatively great separation of men and machine during the launch phase of system operation. Such a solution, however, is not practical aboard an operational naval vessel. Certain topside positions such as gun mounts, gun directors, air defense stations, bridges, etc. must be manned during general quarters. The shipboard approach is really a form of industrial safety in reverse, i.e. how close can one remain to a missile launcher by accepting a reasonable calculated risk. The degree of hazard involved in manning such positions during the shipboard launching of guided missiles is the principal subject of this paper. The magnitudes of these problems are governed by rocket engineering factors, ship design, operational doctrine as regards topside manned positions, and the spacial decay characteristics of the rocket exhaust. In order to better understand the natures of these hazards and the physical parameters upon which their magnitudes depend, one must have some feeling for the basic physics of rocket propulsion. The essential character-

* Presented regularly at the tri-service courses in Medical Aspects of Missile Operations and Basic Orientation of Space Surgeons, Air Force Missile Test Center, Cape Canaveral, Florida.

** Research Chemist on the Staff of the Director, Special Projects Office, Bureau of Naval Weapons, Washington 25, D.C.

FIG. 1. USS *Boston* (CAG-1). A Heavy Cruiser Armed with TERRIER Antiaircraft Guided Missiles.

istics of the physical process through which rocket motors derive propulsive force lead to certain personnel hazards which are directly related to rocket design parameters and performance characteristics. An understanding of these relationships permits a priori estimation of the degree of hazard involved in the operational use of a missile system as a function of engineering data.

PHYSICS OF ROCKET PROPULSION AS RELATED TO NEAR-FIELD LAUNCHING HAZARDS

The primary function of a rocket motor is to convert the potential energy within the propellant system into useful or kinetic energy in the form of velocity of the combustion products. From such a process we get thrust, F, which is the desired product of the rocket motor, i.e. a force which is in a form usable for the propulsion of a vehicle. Figure 2 is a diagram of a typical rocket showing some of the design parameters and performance characteristics which influence near-field launching hazards.

The burning of propellant in the thrust chamber leads to an accumulation of gaseous reaction products at a chamber pressure, P_c, and chamber temperature, T_c. The magnitude of the pressure is determined by the propellant burning rate, reaction temperature, molecular weights of the gaseous products, and the relative dimensions of the

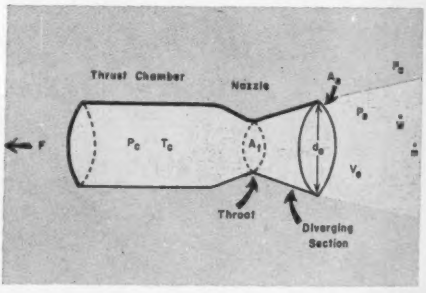


FIG. 2. Rocket Design Factors and Performance Characteristics.

ROCKET PARAMETERS WHICH INFLUENCE NEAR-FIELD LAUNCHING HAZARDS

F	Thrust	V_e	Jet Exhaust Velocity
P_c	Chamber Pressure	T_c	Chamber Temperature
P_e	Exit Pressure	d_e	Nozzle Exit Diameter
P_a	Ambient Pressure	A_e	Nozzle Exit Area
$\dot{W}$	Propellant Weight Flow Rate	A_t	Throat Area
m	Propellant Mass Flow Rate	$\frac{A_e}{A_t}$	Expansion Ratio

chamber and the nozzle throat. High chamber reaction temperatures are desired since they not only contribute to the creation of pressure but also lead to simple low molecular weight gaseous products such as carbon monoxide, water, and elementary nitrogen. Since all gases have essentially equal molecular volumes, the production of low molecular weight chamber gases means the maintenance of a desired chamber pressure with less weight flow of propellant than that required in the case of higher molecular weight gases, i.e. greater range for equal fuel loads. High temperatures and low molecular weight exhausts are also important because of their effect upon the speed of sound in gases, a controlling factor in nozzle exhaust flow to be discussed later. The temperature and pressure conditions within the chamber directly affect the toxic potential of the exhaust gases in that these conditions control the chemical nature and relative concentrations of the molecular species produced during the combustion process. The chamber conditions are maintained by controlling propellant burning rates. In a liquid rocket, the propellant materials (fuel and oxidizer) are pumped into the thrust chamber at accurately regulated flows. Solid propellants are cast as stiff elastomers directly into the thrust chamber and are designed to burn at rates controlled by their chemical composition and physical shape.

In a simple rocket not fitted with a nozzle such as a released inflated balloon or an ordinary fireworks skyrocket, the thrust or propulsive force is equal to the product of the pressure differential (difference between the internal chamber pressure, P_c, and the external ambient pressure, P_a) and the area, A_t, of the opening through which the gases are vented.

$$F = A_t(P_c - P_a)$$

The internal pressure is relieved at the open end, leaving an unbalanced pressure acting upon a portion of the internal surface equal in area to the vent or throat area in a direction opposite to that of the issuing jet.

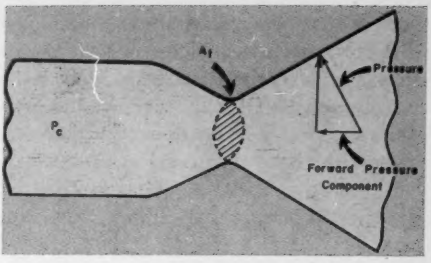


FIG. 3. Vector Analysis of Pressure Forces in the Diverging Nozzle Section.

Thus, the propulsive force is dependent upon internal rocket conditions and is not the result of the exhaust stream pushing against the surrounding air. The thrust level is actually higher in the airless vacuum of space than in the atmosphere, i.e. where $P_a = O$.

In the simple rocket motor exemplified by the skyrocket or inflated balloon, the gases are exhausted at a pressure essentially equal to the internal chamber pressure and thus retain considerable potential energy. Conversion of a large part of this potential energy into additional thrust is accomplished in more sophisticated rockets by fitting the motor with a nozzle. The nozzle functions both as a throttle and as an energy converter.

As the pressure begins to rise in the thrust chamber, the hot gases flow through the throat of the nozzle with a velocity which increases as the chamber pressure increases until the chamber pressure is equal to about twice the ambient pressure. At that point, the nozzle throat velocity is equal to the local speed of sound and is thereafter constant and independent of chamber pressure. Further increases in chamber pressure serve to increase the density of the gases in the nozzle and to thus raise the mass discharge rate. This condition is referred to as "nozzling." The magnitude of the equilibrium chamber pressure is a function of propellant burning parameters and the area of the nozzle throat. Thus, the converging section and throat of the nozzle act as a throttle in controlling exhaust flow rates. As the gases pass the throat at elevated pressure and sonic velocity (Mach 1) and begin to expand in

the diverging part of the nozzle, the diminishing pressure acts at right angles to the inclined surface of the nozzle. Vector analysis (figure 3) of this force shows the presence of a forward component which constitutes additional thrust. As a result of expansion in the nozzle, the exhaust gases are accelerated above the speed of sound and leave the exit plane of the nozzle at about Mach 3-4. Thus, without a nozzle the thrust of a rocket would be essentially equal to the unbalanced force created by the hole in the "leaking" pressure vessel.

$$F = P_c A_t$$

Controlled expansion of the exhaust gases through a nozzle increases the thrust by a factor of 1.3—1.7. This factor is called the thrust coefficient, C_f.

$$F = C_f P_c A_t$$

As to hazard potential, this issue of exhaust gases at an exit velocity of several times the speed of sound will produce severe dynamic pressure loadings on personnel positioned so as to encounter the exhaust flow. This hazardous situation would exist for quite some distance from the launcher area. High jet velocities also lead to considerable spread of the hot noxious gases and thus influence the areas of flash-burn and toxicity hazards. The shears associated with such supersonic flows and the turbulence involved in the degradation of these high velocities are the causative factors of high intensity noise.

The purpose, therefore, of the violent and rather hazardous activity seen in the launching of a rocket is to produce a desired chamber pressure which then acts in an unbalanced fashion on an area equal to that of the nozzle throat and, during expansion, over the internal area of the diverging cone. The fact that such pressures are currently produced by hot gases, marks the present rockets as heat engines.

The propulsive force exerted by a rocket motor may also be expressed in terms of momentum factors and pressure conditions at the exit plane of the nozzle.

$$F = \dot{m} v_e - A_e(P_e - P_a)$$

As shown in Figure 2, $\dot{m}$ is the propellant mass flow per unit time (dm/dt), v_e is the velocity of the exhaust at the exit plane of the nozzle, A_e is the area of the nozzle exit, P_e is the static pressure of the exhaust gases at the nozzle exit plane, and P_a is the ambient pressure surrounding the rocket. For the special case where expansion is complete, i.e. $P_e = P_a$, the exit velocity of the gases is termed the effective exhaust velocity, c.

$$F = \dot{m} c$$

Thus, the thrust level is a direct function of two rates; the rate (mass discharge rate, $\dot{m}$) at which matter (propellant and oxidizer) is consumed in the rocket engine per unit time and the rate of speed of the exhaust gases as they leave the rocket. In the case of low molecular weight exhaust products as mentioned earlier, a particular thrust level may be maintained with a lower mass discharge rate than would be required with higher molecular weights, because exhaust velocity, c, increases as the average molecular weight of the exhaust mixture decreases, i.e. sonic velocity in a gas is inversely proportional to the square root of the molecular weight of the gas.

In essence, these fundamental propulsion equations show that the rocket motor derives its propulsive force in a fashion which intrinsically requires the discharge of vast quantities of exhaust products (toxicity problems) at elevated temperatures (burn hazards) and high velocities (blast and sound problems). The basic physical elements of rocket propulsion are therefore directly related to the indicated hazards of concern to personnel who must remain near the launch area during missile operations aboard ship. Because of this direct relationship between the problems and their causative engineering factors, a priori estimation of the degree of danger to personnel involved in the shipboard launching of a missile is possible.

In estimating the magnitudes of potential hazards associated directly with high exhaust velocities, noise problems in partic-

ular, a very useful performance characteristic is the specific impulse, I_{sp}, of the rocket in question. In order to gain increased range at a fixed propellant take-off weight, it is required that propellant systems be used which yield maximum impulse per unit weight. Specific impulse is a term designed to express this form of propellant efficiency. The specific impulse of a propellant system is the ratio of the total impulse produced to the weight of propellant consumed during a certain burning time and is expressed in units of pounds seconds per pound or simply seconds. It is an accepted yardstick for expressing performance efficiency of rocket propellant combinations.

$$I_{sp} = \frac{(\text{Thrust})(\text{Burning time})}{(\text{Weight of Propellant})} = F/\dot{W}$$

$$F = \dot{m}c = \dot{W}c/g,\ c = Fg/\dot{W} = I_{sp}g$$

$$F = \dot{W}I_{sp}$$

Most operational rockets have specific impulses of the order of 190-260 seconds. It should be noted in the above expressions that high specific impulse or high exit exhaust velocity alone will not necessarily mean high thrust. As previously stated, thrust is not only a function of how fast the exhaust gases flow but also is dependent upon the weight of material exhausted per unit time.

The near-field personnel hazards will be discussed in detail later, but in order to indicate the ability of currently operational rocket motors to produce real problems, a few numbers will be supplied for some of the performance factors and design parameters which govern the magnitudes of these problems.

A. Thrust, F, which is the propulsive force exerted by the rocket motor expressed in pounds of force. The operational surface-launched missiles use rockets ranging in thrust from 50,000—400,000 pounds.

B. Propellant weight flow rate, $\dot{w}$, represents the pounds of propellant (fuel and oxidizer) which are consumed per second and is approximately equal to the weight of propellant consumed divided by the burning time. Flow rates vary from about 200 to 800 pounds per second. Exhaust products are therefore dumped into the launch area at a rate of several hundred pounds per second thus creating toxicity problems for personnel near the launcher.

C. Effective exhaust velocity, c, of the stream of hot gases from the rocket is equal to the product of the specific impulse and the acceleration of gravity.

$$c = I_{sp}g = 6000 - 8000 \text{ ft/sec}$$

This is equivalent to about 5000 miles per hour or between Mach 3-4 under conditions in the exhaust stream. It is this high velocity discharge which gives rise to the blast pressure and intense noise problems.

D. Chamber pressure, P_c, is the internal pressure of the rocket thrust chamber from which the propulsive force is derived. Solid motors operate at pressures up to about 1500 psi, while liquid chambers are at about 300-500 pounds per square inch.

E. Exit stagnation temperature, T_e, is the exit exhaust temperature on the axis of the rocket and is roughly equal to the combustion chamber temperature of about 3000-5000°F for most solids and approximately 5000-7000°F for liquids.

From the magnitudes of these numbers one can see the opportunity for real problems, particularly when it is necessary to man positions near the launch area. The four principal areas of concern and some of the rocket parameters upon which these problems depend are given in Table 1. These design parameters and performance characteristics determine the magnitudes of the problems at their source. The degree of hazard facing operating personnel at a distance from the launcher is largely governed by spacial decay characteristics of the rocket exhaust.

Spacial Decay of Rocket Exhaust Patterns

Several laboratories including the Naval Air Development Center,[1,2,3] and the Applied Physics Laboratory of the Johns Hopkins University[4] have studied the spacial decay of

TABLE 1

PERSONNEL HAZARDS AND RELATED ROCKET PARAMETERS

BLAST (Dynamic Pressure)
- Exit exhaust velocity
- Chamber pressure
- Expansion ratio
- Thrust coefficient

TEMPERATURE (Flash-burn)
- Flame temperature
- Exit diameter
- Exit Mach number
- Thrust to weight ratio

HIGH INTENSITY NOISE
- Exit exhaust velocity
- Specific impulse
- Thrust
- Thrust to weight ratio

TOXICITY
- Propellant composition
- Thrust to weight ratio
- Exit exhaust velocity
- Propellant flow rate
- Flame temperature

rocket exhaust patterns. Decays of exhaust velocity, pressure, temperature, and gas concentrations have been related to distance from the exit plane of the rocket nozzle. The unit of length used in measuring decay distance downstream of a rocket is the exit diameter, d_e, i.e. the diameter of the nozzle at the exit plane. The decay relationships are logarithmic along the exhaust axis and exponential lateral to the axis. These functions permit the estimation of potential hazards in the exhaust pattern, and in this connection, some generalizations are possible.

1. The temperature along the exhaust axis remains roughly equal to the exit axial temperature for a number of exit diameters downstream depending upon the exit Mach number. At an exit Mach number of about 3, the temperature does not drop significantly for about 16 exit diameters downstream.

2. It has been noted that the boundary of the luminous flame produced by afterburning of exhaust products is at a temperature of about 1100°F. For most large rocket motors, this means that the flame could be expected to reach 30-40 exit diameters downstream and would be accompanied by temperatures of about 1100°F in this region.

3. The length of the supersonic region of flow in the exhaust pattern is about 30-35 exit diameters for most rockets of the type used by the military and for the purpose of estimating hazard characteristics of the jet stream could be taken as roughly equal to the flame length. The impact or dynamic pressure at the end of the supersonic zone is about twelve pounds per square inch.

As a result of spacial decay of exhaust patterns, the parameters of velocity, pressure, temperature, and gas concentrations decrease in value from those which exist at the exit plane of the rocket to those which are encountered by personnel who must man battle stations in close proximity to the launcher. The following paragraphs will deal individually with the hazards of concern in terms of conditions which affect personnel safety at such battle stations aboard operational surface ships of the Navy.

BLAST (DYNAMIC PRESSURE)

Pressures aft of a launched missile may be either higher or lower than atmospheric pressure, depending upon the position in the exhaust environment. The static pressure of the exhaust is non-directional and varies from somewhat below to not much greater than atmospheric. On the other hand, the dynamic or impact pressure due to the high velocity of the exhaust is unidirectional in the direction of exhaust flow. It is measured in the hundreds of pounds per square inch at the exit plane of the nozzle and may remain as high as several pounds per square inch as much as 100-125 feet directly aft of the rocket. A one pound per square inch dynamic pressure is roughly equivalent to that produced by a 200 knot wind. A man is not able to stay on his feet in winds of velocities greater than about 50 knots. Thus, even though the static pressure is relatively low in the exhaust flow, the dynamic pressure on an object positioned so as to oppose the velocity of the exhaust flow

may be of sufficient magnitude to result in considerable damage to the object. It is this dynamic pressure which constitutes a hazard to personnel in the vicinity of the missile launcher. Additional hazards are created by the mechanisms associated with the entrainment of air in the boundary region of rocket exhausts, particularly deflected exhausts. The static pressure of the air along the outboard edge of the boundary of the rapidly moving downstream exhaust drops below atmospheric to an extent dependent upon the velocity of the stream in that region. In the processes involved in becoming entrained in the rocket exhaust, the air adjacent to the high velocity flow has imparted to it a velocity which, in accordance with the requirements of energy conservation, is offset by a drop in the local static pressure. This rapid drop in local static pressure on one side of an object normally considered to be secure is sufficient in some cases to cause such an object to be torn free of support by the greater normal atmospheric pressure on the other side. Such unbalanced forces may lift deck treads, peel name plates from bulkheads, and cause these and other such debris to be propelled at high velocities downstream. Such conditions may also result in the unintentional opening of hatches, doors, pressure-relief valves, and blow-out patches.

Temperature (Flash-Burn)

The temperature of a missile exhaust is of the order of several thousands of degrees and may remain highly elevated for a considerable distance downstream, depending upon the degree of afterburning of the exhaust products. The mixture leaves the rocket nozzle in a fuel rich condition, and ignition to produce the visible luminous flame usually does not occur until atmospheric oxygen is entrained and mixed with the hot exhaust gases. Since the residence time of the flame is very short for missiles of high initial acceleration, the temperature of nearby materiel of reasonable mass is normally only rendered warm to the touch. Short lived elevated air temperatures of several hundreds of degrees occur for quite some distance directly aft of the launched vehicle, but the short residence time and the very low heat capacity of air combine to produce only slightly elevated temperatures in the case of the ship's structure and massive materiel. Paint, canvas, frayed ends of manila lines, etc., however, may be ignited by the exhaust flame or heated to the point of combustion by the hot gases directly aft of the flame zone. It should be noted that missiles of the antiaircraft type give rise to flame zones of up to about 80 feet aft of the booster rocket (figure 4).

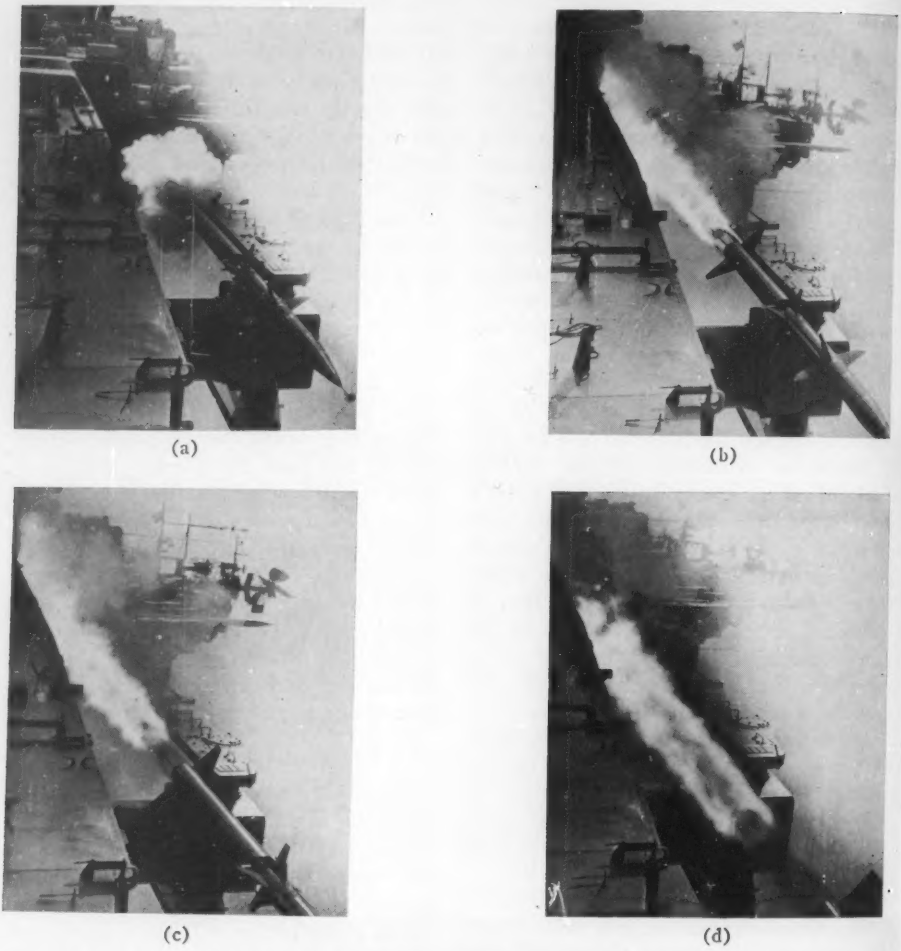
The temperature or burn hazard to personnel is of a different order of magnitude. Serious flash burns may be produced some 100-125 feet from the launcher area. Shipboard animal studies[5,6] have shown that the fur of a rat may be ignited even though untouched by flame some 85 feet directly aft of a launched TERRIER missile. Further studies indicated that a definite flash burn hazard existed for at least an additional 20-30 feet. The TERRIER flame is about 75-80 feet long and could constitute a serious flash hazard to gun crews and repair parties.

High Intensity Noise

The noise[7,8,9,10] of a rocket engine is primarily due to shears and turbulence in the jet stream and is essentially a white sound, i.e., approximately uniformly distributed throughout the octave bands from 20 to 10,000 cycles per second. The acoustic power output of a rocket engine is to a first approximation proportional to the mechanical power of the jet stream and may therefore be related empirically to parameters such as thrust and specific impulse which are associated with the jet stream power level. The overall radiated acoustic power level (OA PWL) may be estimated by means of the following expression:[9]

$$\text{OA PWL} = 96 + 13.5 \log F I_{sp}$$
$$\text{decibels re } 10^{-13} \text{ watts}$$

Boosters of the thrust levels used by the Navy radiate in excess of a million watts of acoustic power. This energy is not radiated uniformly in all directions, but has marked



(a) (b) (c) (d)

FIG. 4. Flame Pattern During a Shipboard TERRIER Firing.

directional characteristics. The directional pattern of noise radiated from the exhaust of a rocket engine varies with the design parameters but, in general, the maximum over-all sound level occurs at an angle of approximately 45° to the exhaust axis. The variations in sound pressure levels may exceed 15 decibels at equidistant positions on bearings abaft the beam of the missile, with the noise level increasing to a maximum on the quarter, and falling off again thereafter.

Aboard the guided missile ships[11, 12, 13] topside personnel at positions nearest the TERRIER launchers are subjected to sound levels of the order of 150 to 155 decibels. Fortunately, the missile noise is of very short duration. In order to permit a comparison of missile noise with a familiar reference sound, determinations were made of sound levels produced at normally manned positions during the firing of the main and secondary batteries[11] aboard a heavy cruiser. Analysis of these data showed that high sound levels such as those produced at topside manned positions during the shipboard firings of TERRIER missiles are not new to the Navy and are actually not as intense as some familiar gunfire noises. Missile sound

levels at After Air Defense, the topside manned position nearest the TERRIER launcher, were found to be intermediate between those produced during the firing of adjacent 3-inch and 5-inch guns and far less than the noise level on the Flag Bridge during the firing of a six-gun salvo from the main battery of 8-inch guns.

Toxicity

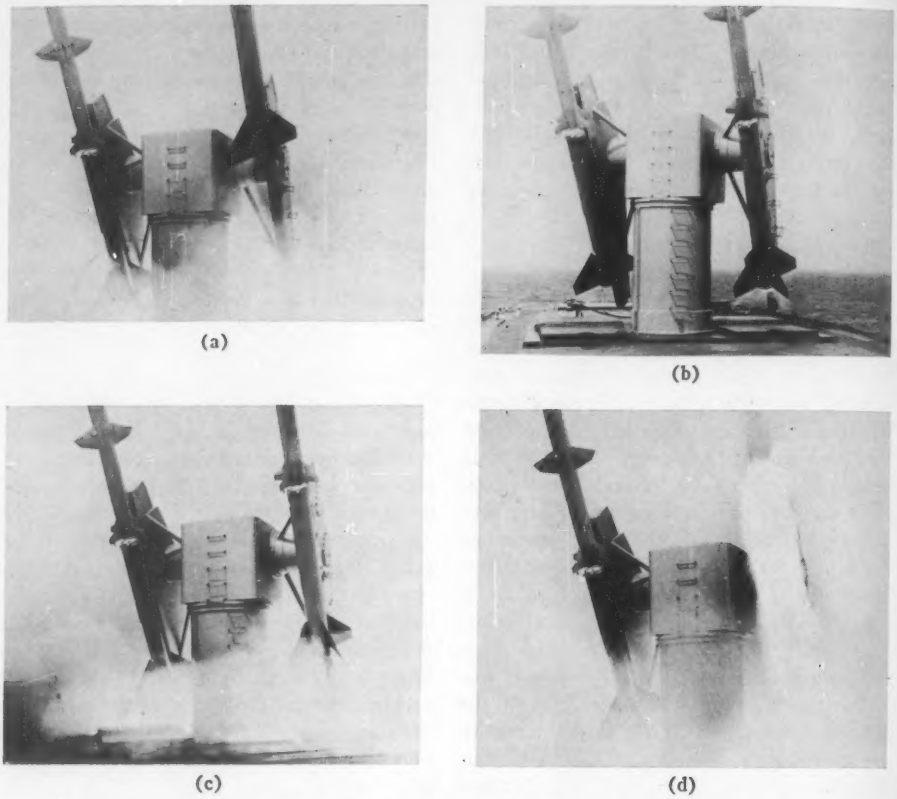
Guided missile power plants of the liquid rocket type utilize a variety of toxic and corrosive chemicals as fuels and oxidizers, the handling of which aboard ship would present the Navy with quite a problem. Needless to say, the Navy has preferred to avoid the problem of handling such materials aboard operating ships through the development and use of solid propellants and prepackaged liquid combinations. The boron hydrides are examples of high performance liquid fuels which are accompanied by a high toxicity price tag. The recently cancelled TRITON ramjet surface-to-surface missile was to use fuels of this type and was to be carried aboard submarines in much the same manner as the REGULUS missile. In the closed atmosphere system of a submarine, the vapor from one jigger of such a fuel evenly distributed in the submarine air would have greatly exceeded the estimated threshold limit value. Before the formation of the POLARIS project, the JUPITER with its liquid oxygen oxidizer was considered for shipboard use. The POLARIS will utilize a composite solid propellant.

The solid rocket motors of operational Navy missiles make use of two general types of propellants; double-base propellants principally consisting of nitrocellulose plasticized with nitroglycerine, and composite propellants wherein a solid oxidizer such as perchlorate or nitrate is suspended in a plastic fuel-binder. The vapors evolved during shipboard storage of motors using such propellants have so far constituted no great problem. The primary products of combustion are carbon dioxide, carbon monoxide, water, nitrogen, hydrogen chloride (perchlorate composites), and small amounts of oxides of metallic additives. The major source of possible toxic consequences aboard ship[14,15,16] is the entrapment of these combustion products in confined spaces which have possible ports of entry of the gases exposed to the direct supersonic blast of the booster rocket. Therefore, the degree of hazard as far as combustion products are concerned is a function of ship design and reliability of seals around hatches and other closures (figure 5) as well as the composition of the propellant used in the booster motor.

Shipboard Firing Tests

During the structural firing tests conducted as part of the readiness-for-sea trials of each guided missile ship, studies are conducted to determine the degree of hazard to personnel produced by firings at missile attitudes considered to be the most dangerous. The Applied Physics Laboratory of the Johns Hopkins University set the general pattern for the tests in directing studies aboard the Navy's first operational surface vessels designated as guided missile ships; two heavy cruisers, USS BOSTON (CAG-1)[17] and USS CANBERRA (CAG-2)[18], and the destroyer USS GYATT (DDG-712)[19], all of which fire TERRIER surface-to-air missiles. In the case of CANBERRA, a documentary movie[20] was prepared to illustrate the techniques employed in the shipboard investigation of the personnel hazards of concern. These CANBERRA studies were coordinated by Morton Goldman of the Johns Hopkins Applied Physics Laboratory (now with Space Technology Laboratory, Los Angeles, California) who also was responsible for blast pressure studies. Sound studies were conducted by Andy Asti of the Philadelphia Naval Shipyard, with burn studies under the direction of Lee Green of the Medical Acceleration Laboratory, Johnsville, Pennsylvania. My laboratory at the Naval Medical Research Institute, Bethesda, Maryland was responsible for noxious gas studies aboard these early TERRIER ships.

Beginning with the TALOS missile structural firing tests[21] aboard the USS GALVESTON (CLG-3) in 1959, responsibility for further studies related to missile hazards



(a) (b) (c) (d)

FIG. 5. Impingement of TERRIER Booster Rocket Exhaust on a Shipboard Missile Magazine Door.

aboard operational surface ships has been assigned to the Weapons Development and Evaluation Laboratory of the Naval Weapons Laboratory, Dahlgren, Virginia. TERRIER firing tests were recently conducted by personnel of the Naval Weapons Laboratory[22] aboard the USS PROVIDENCE (CLG-6). Data from such tests are forwarded to the Bureau of Medicine and Surgery for evaluation and form a basis for the formulation of personnel protective measures and shipboard operational doctrine.

The U. S. Navy Toxicology Unit at Bethesda, Maryland has conducted studies[23, 24, 25] aboard the USS OBSERVATION ISLAND (EAG-154) related to entrapment of POLARIS booster combustion products during test firings as part of the development program of the Fleet Ballistic Missile Weapon System. Extensive sound studies of POLARIS launchings at Cape Canaveral are being conducted by the Missile and Space Division of Lockheed Aircraft Corporation. These data will be used in the early estimation and control of personnel hazards associated with the operational deployment and further development of the POLARIS missile system.

SUMMARY

Rocket propulsion requires the discharge of vast quantities of exhaust products at elevated temperatures and high velocities. The application of rocket propulsion to shipboard weapons systems gives rise to conditions of a potentially hazardous nature to personnel who must remain near the system during the launch phase of operation. The hazards

of concern are those of dynamic pressure loadings, high intensity noise, temperature and flashburn, and toxicity. The magnitudes of these problems depend upon rocket design parameters and performance characteristics as well as ship design and operational doctrines and readily lend themselves to estimation by calculation. Actual shipboard tests are conducted during missile firings aboard both test-firing and operational naval vessels in order to provide for a high degree of personnel protection and to form a basis for future ship design.

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Abstract of Article Entitled "The Anamnestic Antibody Response to Japanese Encephalitis Virus in Monkeys and its Implications Concerning Naturally Acquired Immunity in Man,"* by Lee, H. W., and Scherer, W. F. The complete article appears in a current issue of the *Journal of Immunology* with whose kind permission this abstract is published.

Primary and anamnestic antibody responses to infectious Japanese encephalitis virus were studied in monkeys. The intradermal anamnestic dose of virus in suspensions of Japanese mosquitoes collected in nature was small, essentially equal to the intradermal infectious dose for susceptible monkeys, and well within the range of virus which vector mosquitoes might inoculate. Anamnestic antibody responses were uniformly measurable by hemagglutination-inhibition tests, usually detectable by complement fixation tests, but only infrequently demonstrable by virus-dilution neutralization tests. That anamnestic antibody responses resulted merely from virus antigen inoculated intradermally and did not depend on multiplication of virus in blood, skin or superficial tissues of previously infected monkeys was evidenced by 1) lack of measurable viremia and virus proliferation in skin or superficial tissues and 2) the ability of non-infectious, ultraviolet-irradiated virus to stimulate anamnestic antibody responses as readily as infectious virus. The fact that small amounts of infectious virus stimulated anamnestic antibody responses in previously infected, non-viremic monkeys whereas large amounts of virus were available in viremic, susceptible monkeys to evoke primary antibody responses is compatible with the increased sensitivity of hosts to small "booster" injections of antigens; it does not necessarily infer that anamnestic antibody responses occur as a result of virus multiplication in previously infected hosts.

These findings upon extrapolation to humans, suggest that a single endemic arthropod-borne virus can, upon transmission by vector mosquitos, repeatedly stimulate anamnestic antibody responses in man and thus maintain detectable antibody levels and immunity through life. Moreover in areas such as the Kanto Plain near Tokyo, Japan, where JE virus is the only known group B arthropod-borne virus, seasonal rises in HI and CF antibody titers to JE virus in persons with preseasonal homologous neutralizing antibody need not imply that another group B virus exists in the same geographic region.

HI, CF and N antibodies remained detectable in monkeys for at least 11 months after primary inapparent infection. HI and CF anamnestic antibody responses to large doses of JE virus were not significantly inhibited by high, pre-existing HI, CF or N antibody levels in serum or hyperimmunized monkeys, but the effects of high antibody levels on anamnestic antibody responses to subsequent small virus doses was not conclusively ascertained.

* This investigation was conducted under the auspices of the Commission on Viral Infections of the AFEB, and was supported in part by the Office of The Surgeon General, Department of the Army, Washington 25, D.C.

Darkest Africa

By

AMOS R. KOONTZ, M.D.

THIS title is not without significance—neither with regard to the natives of the Dark Continent nor with regard to the immediate outlook for its inhabitants (of all colors).

Last summer my wife and I spent five weeks in Central and South Africa—the Belgian Congo, French Equatorial Africa, the Union of South Africa, Southern Rhodesia, Northern Rhodesia, Uganda, Kenya, and Tanganyika. We were able to note both the progress and lack of progress made in these countries. On the progress side may be noted such sprightly modern cities as Leopoldville (in the Congo), Brazzaville (in French Equatorial Africa), Capetown and Johannesburg (in the Union of South Africa), Salisbury (the capital of the Federation of Rhodesia and Nyasaland), Livingstone (in Northern Rhodesia), and Entebbe and Kampala (the capitals of Uganda), Nairobi (the capital of Kenya), and Arusha (in Tanganyika). Some of the debits will be recounted below.

We had planned quite a little tour of the Belgian Congo. A few weeks before leaving on our trip, a friend in Capetown wrote us that current reports were to the effect that things would not be very pleasant in the Congo after the Congolese gained their independence on June 30. I telephoned to the official in charge of African Affairs in our State Department and asked him to give me what information he could with regard to this. He was very obliging, said that he had heard the same thing, and that what would happen in the Congo after June 30 was anybody's guess. He would not advise me either to go or not to go. I, therefore, cancelled our tour of the Congo and decided to spend the time in Tanganyika instead.

However, in order to get to French Equatorial Africa, we found it necessary to fly from Rome to Leopoldville, where we arrived early in the morning of July 6. On arrival, a very attractive young married Belgian girl travel agent met us at the foot of the ladder as we disembarked from the plane. On entering the airport building we found a Congolese soldier standing in the doorway with his back against one door jamb and with a club extended across the doorway. Our Belgian girl pushed his club away in an authoritative manner and we walked in without any difficulty. Her display of authority was impressive both to us and to the soldier. Our guide took us to a car and drove us around Leopoldville, which is a beautiful city of 300,000 (20,000 Europeans). The streets were full of Congolese, which our guide said were on strike. She felt that the situation would soon be under control and that the Congolese would want the Belgians to stay because she felt that they (the Congolese) could not run the government without assistance. However, there was considerable evidence of agitation, and in several places there were agitators on pedestals of some sort haranguing the crowds of milling Congolese. Several times we were stopped and asked where we were going. In each case our guide again spoke firmly and authoritatively to her inquisitor and we were allowed to pass. After a few hours of seeing Leopoldville, we were guided across the Congo River by ferry to Brazzaville in French Equatorial Africa, where the atmosphere was entirely different and we felt the security and tranquility of the French orderliness, although Brazzaville is a city of 100,000 with only 3,000 Europeans.

Our attractive Belgian girl had crossed the Congo with us and at the dock in Brazzaville we were met by an attractive young French married woman who was to act as our guide there. The four of us repaired to the pleasant terrace of the very attractive Le Relais Hotel where three of us sipped whiskey and the young French matron sipped tea. Both French and Belgian girls had wonderful senses of humor and with many stories and much laughter we discussed the weird state

of affairs in that part of the world. The Belgian girl told us that on Independence Day (June 30) Baudouin, King of the Belgians, had very graciously come to Leopoldville, signed the treaty of independence, and made a very nice speech. This was replied to by the new Congolese Prime Minister in insulting terms. The Congolese had killed a number of each other three days before our arrival and they had called on the white police to protect them. Up to then they had killed no Europeans.

On Independence Day our ambassador had presented them with a statue of Abraham Lincoln. They said that it was a fine statue but why hadn't we given them a car? The Germans had given them an airplane. They won't fly planes so weren't satisfied with that either—wanted a car. The Belgians gave them some rare old literary gem to which they referred as "that old book."

The day after we left Leopoldville things got very much worse and a day or two later got completely out of control. After spending three days with Dr. Albert Schweitzer in Lambarené, on getting back to Brazzaville we found the town full of European refugees from the Congo. We learned that our pretty Belgian travel agent, contrary to her expectations, had had to leave Leopoldville hurriedly with her husband and 5-year-old daughter with none of their possessions except what they had on their backs. This was true of practically everyone who left. When one European woman was getting ready to leave, her Congolese house boy told her that she couldn't leave because she now belonged to him. He actually believed this—such were the fantastic tales that had been told these people about the changes that would take place after they got their independence.

In getting the refugees out of the Congo, families were broken up—children were sent first, then women, and finally men. On reaching Brazzaville there was great difficulty in the various members of families getting reunited. Some women who were not fortunate enough to get away were raped continuously for 24 hours until they were black and blue and could not walk. Children and old nuns were raped. Women were burned with cigarets. Some were saturated with gasoline and burned to death. Men were made to walk barefooted on barbed wire. Congolese soldiers decommissioned their European officers. One Congolese soldier was promoted from sergeant major to commanding general, but did not last long. Colonel Mobutu, now chief of staff, was promoted almost overnight from corporal to that high office.

Nearly a month later I met a highly intelligent and very attractive Belgian in Tanganyika and asked him why the Belgians had turned the Congo loose so soon. He said: "Because certain great nations, including your own, put pressure on us to do it." He meant, of course, that we did this through the United Nations. I told him that I had no answer for that and disapproved of the action as much as he did. I also asked him why the Belgians hadn't told us to go to hell and mind our own business. He said "Because of international trade."

The Belgian also related an incident which is revealing so far as the character of the local people are concerned. In a club in the Congo he had said to a servant, "Boy, get me a beer." Nothing happened. He had to repeat the request three times and get very firm about it, when finally the servant said, "Me no boy, me air hostess." The boy obviously wanted to be something he wasn't—had higher aspirations (a very worthy ambition), but hadn't the foggiest notion as to how to go about it, or any inclination to do the things necessary to get on in the world, except to have something handed to him for free.

The Union of South Africa is a highly developed country. There are ranches there so large that the King Ranch in Texas would rattle around in them like it was lost. Capetown is a beautiful city with delightful people. Everyone knows that the country was settled first by the Dutch and then by the English. There has been much talk about giving the country back to the natives. It would be just as logical to talk about our giving this country back to the Indians. Furthermore, when the English and Dutch settled there, there were no natives closer than 1,000 miles north of the Cape of Good Hope.

The only reason they are in South Africa now is to get jobs from the Dutch and British who have been there for many generations. The winter climate is not to their liking and that is why they had not migrated further south before. There has been much criticism of the way the South Africans have treated the natives. I am in no position to pass judgment on this. The South Africans divided the non-Europeans into "coloreds" and "blacks." The coloreds are an assortment of mulattoes, Malayans, etc. The blacks are the natives of undiluted blood. The coloreds have more privileges than the blacks. They may go into the towns at night. The blacks may not. They live in different "locations." The locations are government housing projects and are comparable to our own such projects, except that they are spread out, more individualized and more attractive. The difference in dealing with the two groups—coloreds and blacks—and the difference in rules is based on experience. Indeed it might be said that wherever racial prejudice exists, it is based on racial experience. The races clash because they are different. Racial prejudice is not based on color but on the way the races act. Blacks are often heard to say to whites "I am just as good as you are." Maybe so, but certainly they are different. No one can get around that fact of biology. The differences are psychic as well as physical.

There has been a great deal of criticism of the fact that the South Africans require all the natives to carry identification cards. This I was told was also based on experience. Again, I do not know enough about the situation to judge its merits or demerits. I do know, though, that the South Africans feel very strongly about the matter. At dinner one night my host, a charming and highly cultivated chap who had recently moved to Capetown from England, said "Democracy wants every ape to vote, and grumbles when it is ruled by a gorilla."

On arriving in Salisbury, the capital of the Federation of Rhodesia and Nyasaland, our travel agent did not meet us because of a strike; 75,000 natives had not turned up for work that day. One hundred police battled the native mob for five hours. The mob threw stones and broke automobile and shop windows. It was finally dispersed by tear gas.

The next morning our travel agent told us that she didn't understand why we had not been met the previous afternoon, that when the natives did not show up, the members of the agency staffs themselves drove the cars. She said that the day before the busses had not been running because of the strike. However, her natives walked ten miles to work and so were late. She sent them home by car. She said that most natives were all right, but were provoked to violence by rabblerousers, who told them that if the Congo could do it, they could do it, and to start shooting. What the rabblerousers don't tell them is that there are only 12 doctors and lawyers altogether in the Congo and of the vast advantages the local Europeans have given the local natives. She said that the Congo had stirred up the whole continent and that no one could say today what the situation would be tomorrow.

That the Africans are primitive people is self-evident to anyone who cares to go and have a look. A great many of them have holes in the lobes of their ears, made by gradual stretching with wooden plugs, large enough to thrust one's fists through. A great many have huge rings inserted through the tops of their ears, which cause them to sag painfully, I would think. Some have their heads shaved and smear honey all over their scalps to attract flies. Their heads are covered with masses of black flies. We passed dozens of them walking along the road carrying spears. Very few cultivate the land. Some raise cattle and sheep. Cannibalism is still practiced. Only recently the Congolese ate a Belgian pilot. Corpse eating is still in vogue, as is medicine murder and leopard-man murder. Superstition is rampant. A great many natives carry cornucopias, full of various parts of the human body, for good luck. When they need more good luck meat, a medicine murder is committed. Someone is designated to commit the act while others look on. Parts of the victim are hacked away piecemeal while he is alive until each member of the tribe gets the good luck piece he

wants. One man being so hacked to pieces appealed to his brother-in-law to help him. His brother-in-law replied that he could not do anything about it or he would suffer the same fate himself. A leopardman murder consists of a man donning a leopard skin with a lot of iron claws for his fingers, with which he claws his victim to death.

Nor can one deny that the British have done remarkable things for the natives in the building of hospitals, schools, and roads. Almost 11 billion acres are now under cultivation in Kenya. Fifty years ago this area was roamed by tribes with no thought of doing anything but hunting, fighting, and killing and eating each other. The land was not naturally fit for cultivation. The British, by changing it chemically and using the right kind of fertilizer, have made it very productive. Twenty percent of the land is now owned by the British, who produce 80% of the crops. Eighty percent is owned by the natives who produce only 20% of the crops.

I visited a number of British hospitals run for the benefit of the natives. One European chief of surgery told me that the natives were not really interested in medicine, but only used the medical degree as a stepping stone to politics. In making ward rounds in another hospital—a large 1,000 bed modern institution—the surgeon conducting the rounds asked his native registrar (resident) —educated in a local university, which is an affiliate of the University of London—whether the bone fragments in a fracture case were in proper apposition. The reply was "Oh yes." When the surgeon asked for the x-rays, it was disclosed that there was marked overriding which, had he not checked, would have resulted in marked deformity. He told me that this was typical and that it happened all the time. He remarked that time was the most precious thing in the world and that they needed a lot of time to get these people ready for self rule. I said, "Yes, probably a couple millions of years of evolution." He thanked me for understanding his problem.

The man who started the frightful mau mau atrocities was educated in England and then had two years in Russia. Initiates into this murderous clan were taken into the jungle at night and made to swear the most obscene oaths. Their object was the complete obliteration of the whites. Anyone who had taken the oath and who did not participate was killed himself. It cost the British 50 million pounds to put this terror down. There are still occasional outbreaks of it.

And yet the Africans want their independence right now, not tomorrow nor the next day, or whenever they are ready for it. It took us 50 years to prepare the Filipinos for independence and we made a pretty good job of it. It will take a lot longer than that, very, very much longer, to get the Africans ready. One doctor in Kenya told me that a native said to him, "When we get our independence, I am going to take your car and drive any place I want to and on whichever side of the road I want to drive on." He told me that he had been in Kenya for more than 20 years, that he owned two houses which had been worth a lot of money, but now there was no sale for them. Should the Africans be given their independence, he will have to leave and lose all of his property. Some Europeans have been there practically all of their lives and have done wonders in developing the country. Independence for the Africans would mean the loss of all their property and the giving to people, just about as capable of governing themselves as are 7-year-old children, property and facilities which they played no part in the developing of.

I said to one outstanding doctor, the director of a large hospital, "It seems to me that the only thing that the British can do with these countries (Kenya, Uganda and Tanganyika) is either to rule them with a firm hand or else get out and let chaos reign." He said, "We can't do the latter or the Russians will come in." I submit that the Russians would not be able to come in if the West would stop trying to appease them. In appeasing the Russians, we are only appeasing principle. If the West would make it clear to them that we will not stand for any more of their ruthless expansion, our case

would be clear and our problems simplified. I wonder whether we will ever have the intestinal fortitude to do it.

I talked with everyone I could in Africa about their problems and about the relationship of the United Nations to them. I did not meet a single person who was in favor of what the United Nations is doing. All felt that the United Nations was an obnoxious meddlesome organization dabbling in affairs that they knew nothing of and insisting on independence for people who have shown not the slightest potentiality for governing themselves.

What has brought about such a situation? I believe that the fundamental defect in the Western nations who participate in this program is due to the deteriorating influence of socialism—the political philosophy which advocates giving people everything they want whether they have earned it or not. Nations have never progressed under such a system, but have always gone downhill. Anyone who is looking for the historical evidence for this has only to read Spengler's "The Decline of the West." Certainly our country was not handed to us on a silver platter. Our country was made by the hard work of our ancestors, and their independence was gained by their fighting one of the most valiant and determined wars that any country ever fought. It must be pointed out, too, that that revolution was entirely different from any other revolution ever fought. It was not fought simply to gain an independence resulting in one class dominating another. It was fought as a matter of principle—to maintain the rights and dignity of man. Our ancestors would have been perfectly willing to remain a part of the British Empire had they been accorded the rights and dignities of other British subjects. Now we are in the position of advocating freedom for people who have done nothing to merit it, who have never done anything constructive, who do not like to work, who are still for the most part savages, who do not want their independence as a matter of principle but simply to grab something which more progressive peoples have made for them.

The present wave of anti-colonialism is absurd. There will always be spots in the world where authority is needed, just as there is in that primary unit of all society—the family. No one questions the authority of the head of the family and the law guarantees his right to rule his family until his children are mature. With the right to rule them goes an obligation to see after their welfare. Certainly the rule of the British in Africa is benign and is directed towards the welfare and development of the people under them. When the people in the British colonies or protectorates reach maturity, it will be time enough to talk about independence for them, but that will be a long time off.

There are always underdeveloped people who are insisting on rights, but who have no notion of accepting the obligations which go with those rights. Such an idea is contrary to every concept of modern society, which we have held, until very recent times. We have become soft and our softness is not kindness. It is an attempt to appease people, who should be told plainly and bluntly that what they want is not good for them—nor for the rest of the world either.

During our tour of Africa we went on many sightseeing safaris in the game reserves, many of which include thousands of square miles, and in which no one is allowed to hunt the wild animals. My wife and I constantly remarked on how clean and fit the animals looked. They still follow natural biological laws—the struggle for existence, natural selection, and the survival of the fittest. Homo sapiens (I question the wisdom of the specific term) has abandoned natural laws. No one must any longer struggle to survive. He must have everything handed to him on a silver platter from the cradle to the grave. Natural selection is no longer followed and therefore the unfit and not the fit survive. The fit are imposed upon and penalized for the benefit of the unfit. Such a world cannot prosper. It is high time we were re-evaluating ourselves.

1014 St. Paul Street
Baltimore 2, Md.

Psychiatric Orientation for the General Medical Officer*

By

CHARLES A. CAHILL III, M.D.†

THE task of providing adequate psychiatric orientation for young physicians just entering the military services is both important and formidable. During their three week period of indoctrination prior to transfer to permanent duty assignments elsewhere, the psychiatric department of the hospital providing orientation has only a short time to prepare these doctors, many of whom are just out of internship, for the management of what will be a significant portion of their general military medical practice over the next two years.

The problem stems, in part, from the frequently insufficient formal psychiatric training that students receive in medical school. To make matters even more difficult, military psychiatry with its admixture of legal complications and administrative regulations necessarily differs from its civilian counterpart more than does any other specialty in medicine.

It is a far cry from the fleeting memory of a few technical psychiatric terms or the brief observation of a number of patients in a state or general hospital to the practical management and disposition of a psychiatric problem hundreds of miles possibly from the nearest available consultant.

A complete course in psychiatry designed to fill all of the doctors' gaps in knowledge and experience is obviously out of the question. At the other extreme, however, the usual generalities in discussions of unconscious processes or of symptom formation in an attempt to skim over the entire field in a brief time invariably accomplish little of concrete value and are of no more immediate help to the doctor than is the well-worn cliche, "Treat the patient as a whole."

The solution developed for the psychiatric portion of the orientation program given at the St. Albans Naval Hospital was a practical guide to the management of the specific types of problems which were most likely to confront a general medical officer during his tour of duty. The approach which seemed to work best was one that dealt with the common psychiatric symptoms and what to do about them rather than with the more theoretical aspects or diagnoses *per se*. Although the usual categories of psychiatric illness are utilized for orderliness of presentation, the focus of attention is at all times directed at the symptoms themselves rather than at their classification.

The hope is that the outline will enable the general physician not only to decide which ones among his patients are really in need of psychiatric referral, a problem of no mean tactical importance when considered from the viewpoint of a ship's captain 1000 miles at sea, but also to treat a significant portion of these patients right in the dispensary itself.

I. PSYCHOSES

The general medical officer will not as a rule find it difficult to recognize the acute psychoses. Any or all varieties of symptomatology may be present—delusions, hallucinations, and assaultive behavior, as well as the more subtle symptoms of less seriously ill patients, such as extreme argumentiveness, irritability, odd behavior, or merely an ill defined "peculiarity." One special entity seen in the military is the so-called "travel syndrome," a transient acute psychosis appearing in men traveling from one duty station to another or going to and from leave.[1]

The doctor called to treat psychotic patients has one major problem—what to do until hospitalization can be arranged. In

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Opinions expressed herein are those of the author and do not necessarily reflect the views of the Navy Department or the Naval Service at large.

* From the Neuropsychiatric Service, U. S. Naval Hospital, St. Albans, L.I., N.Y.

† The author is now at the New York University-Bellevue Medical Center, New York, N.Y.

brief, there are four general rules for immediate therapy:

(1) *Reassurance of the staff,* especially the dispensary corpsmen and the patient's division officer. Psychotic patients, when under crowded conditions such as are found aboard ship, tend to unsettle the entire crew, and the uneasiness or outright fear on the part of others frequently makes the patient worse in turn. The medical officer must take complete charge of the situation and reassure everyone that there is no need for alarm.

(2) *Psychological sedation* in the form of a private room in the dispensary or barracks, constant companionship and observation by special watches, reassurance of the patient himself, and, above all, preservation of his dignity at all times as, for example, by abstention from the use of weapons to control him. The patient should be told what treatment is going to be given and what the immediate plans for his disposition are to be.

(3) The use of *sedation with drugs,* if necessary. The usual tendency is to place this measure first, whereas it really belongs last. In fact, mere sedation of a psychotic patient without an accompanying explanation or consolation may frighten him further and aggravate rather than relieve his condition. The most propitious drugs are the barbiturates or chlorpromazine, 50 milligrams intramuscularly, followed by oral doses in 50 to 100 milligram amounts every six hours afterward as needed.

(4) Arrange for *definitive treatment in a hospital.* Many times the patient's condition is not really an emergency and can be delayed even for days if necessary as long as these basic elements of proper care are provided. Some transient conditions, such as the travel syndrome, may even abate in twenty-four hours or so and make hospitalization unnecessary. However, the majority of patients will benefit from a complete psychiatric evaluation, and arrangements should be made whether they are ultimately utilized or not. It might be noted in passing that these general principles apply under battle conditions as well. The tactics naturally vary with the exigencies of the situation, but the sequence of support to the staff, psychological comfort to the patient, use of drugs and arrangement for hospitalization obtains anywhere.

II. Neuroses

Most neuroses of classical description, such as phobias and obsessive-compulsive reactions, are quite rare in the military. Occasionally one sees a fear of water in a recruit about to put to sea, and one normally expects intense fear to arise in impending battle, but under ordinary circumstances the problem can be managed by simple environmental manipulation.

Not long ago, for example, the author examined a fireman with over eight years of service in the Navy, who had spent his entire period of duty below decks. When he was given a new duty assignment in the superstructure of an aircraft carrier, an intense fear of heights was unmasked, and he was referred to the hospital for treatment. We simply advised return to his former duties. The problem was promptly alleviated! Severe neurotic conditions not so easily managed, however, require definitive psychiatric treatment.

One classic condition not infrequently found in the military is conversion hysteria. Freud's classic descriptions of neurotic illness were concerned principally with hysteria, a condition then both common and even fashionable, especially among young women. Much less frequent nowadays, it is seen primarily in less sophisticated patients from isolated rural areas and in certain cultural groups.

The presenting symptoms are variable, but the most common varieties include paralyses, postural abnormalities (such as wry neck or even marked kyphoscoliosis), anesthesias unexplainable neuroanatomically, tunnel vision, and epileptiform attacks. Most of these are primitive responses to a threatening situation, though a few are linked to more obvious secondary gain such as a desire to avoid duty.

Hysteriform symptoms may rarely be reproduced by malingerers, but these usually occur under special circumstances (*e.g.,* in

the brig). The diagnosis of hysteria usually rests on the absence of explanatory organic pathology; one would find, for example, normal deep tendon reflexes in a hysterical paraplegic.

Proper treatment of the condition is extremely effective and can bring about recovery rates approaching one hundred per cent. The word recovery is used rather than cure in order to avoid the implication that the underlying personality conflicts are eradicated necessarily. What is meant is that treatment motivates the patient either to give up the symptom or to substitute a less disabling one. This is not meant to imply that the symptoms are of conscious origin and hence subject to the patient's mere wish to dispel them, but it is possible to reach and alter the patient's unconscious conflicts through the application of external forces whose *modus operandi* is largely outside of the patient's awareness. This process differs from most types of dynamic psychotherapy in that it tends to suppress rather than to uncover unconscious conflictual material. Exploratory techniques, however, such as narcosynthesis, hypnosis, or intensive psychotherapy, are so specialized as to be impractical for use in the general clinic or dispensary. Suppressive therapy is usually just as effective on a superficial basis and can be employed much more readily.

In any form of treatment of the hysteric the doctor, first of all, must himself be convinced of the symptom's functional nature. Failure in treatment probably stems more often from the physician's vacillation than from any other cause. He should try to have a matter-of-fact attitude toward the patient and should avoid the impression of overconcern. The customary daily examinations on ward rounds coupled with a plethora of laboratory tests are inimical to recovery and are, hence, contraindicated; such procedures violate the principal tenet of treatment—to permit the patient to give up his symptoms—because they reinforce his somatic preoccupation and fix the symptoms through support of his unconscious neurotic needs and sometimes through secondary gain as well.

On the psychiatric service at St. Albans motivating forces are utilized in several ways. First of all, the patient is hospitalized on the closed ward. This technique in itself emphasizes to him in no uncertain terms the opinion that his symptoms are psychological rather than physical in origin. After the initial physical examination there is no further "laying on of hands." Requests by the patient for a transfer to the open ward or for other special privileges are met with the kind but firm attitude that such an alteration in the therapeutic program would be inconsistent with the severity of his symptoms and that, as with any other patient, privileges come with improvement in symptoms. Most patients improve dramatically within a few days to a week or so, and such a treatment program can easily be carried out in a dispensary or aboard ship. The only requisites are that the doctor have the courage of his convictions, be able to maintain a kind, but firm, attitude without displaying hostility toward the patient, and resist the ever present temptation to infantilize the patient with physical manipulations.

The diagnostic label most frequently employed by general medical officers when describing emotional disorders is "anxiety reaction." In reality, this label is usually the least applicable. True neurotic anxiety reaction as it most frequently occurs results from an acute traumatic stress, such as occurs after an accident or in battle, which overwhelms the personality and renders it subject to recurrent episodes of anxiety or to more vaguely defined symptoms which persist in the form of fatigue, anorexia, insomnia, and so forth. Vigorous psychiatric therapy using exploratory techniques is often very beneficial.

This type of anxiety syndrome differs markedly from that to which the term is so often misapplied, namely, a chronic emotional disturbance in which anxiety appears only as a symptom. The details of the differential diagnosis of anxiety is beyond the province of this discussion, but in general treatment will depend on the underlying difficulty both in terms of its type and its dura-

tion. In acute maladjustments, for example, usually called "situational" because the precipitating environmental factors appear and disappear quickly, the patient is best treated by the doctor's talking over the problem with him and giving him a mild sedative with or without a few day's rest from duty.

Chronic anxiety, on the other hand, is more difficult to manage because it so often is symptomatic of borderline psychotic states or of character disorders. One of the foremost characteristics of the former is that after one has taken a history and attempted to analyze the problem, it is still difficult to appreciate why the patient should be as anxious as he is; in other words, there is a hint of the bizarre or the patient's reaction seems grossly inappropriate to the severity of the stress. Such patients are treated best by a mild sedative in conjunction with regular visits to the dispensary for fifteen to twenty minutes of reassurance and support. Psychiatric consultation should be requested if this does not suffice, though rarely is this an emergency situation.

The other cause—character or personality disorder—leads to a discussion of the most prevalent group of psychiatric disturbances in the military service.

III. Personality Disorders

The personality disorders subsume a vast, somewhat vaguely defined group of entities whose etiology is controversial and whose treatment even under ideal circumstances is frequently ineffective if not impossible. Part of the difficulty is that this group regrettably has become a wastebasket category for many kinds of disturbances with an infinite variety of symptomatology.

The medical officer can forget about diagnostic labels and should concentrate on the man's presenting symptoms; disposition can be based on these rather than on the exact diagnosis, which in itself is of little help in these cases. Of the many different sorts of personality disorders, there are several groups with which every medical officer should be familiar.

(1) *Immaturity symptoms.* Bedwetting and homesickness are the most common of these. Enuresis seems to represent a marked deficiency in certain aspects of personality development, though some investigators disagree with this concept[2] and some even consider it to be an inherited organic deficit.[3] The symptom is felt by most to be a reaction associated with threatened loss; the usual example of this is the appearance of enuresis in a previously continent child at the time of the birth of a sibling. Induction into the service and removal from the protective environment of the home can pose as a similar threat.

The symptom, regardless of origin, is unacceptable in servicemen not only from a standpoint of hygiene but also that of morale; the enuretic is often the subject of ridicule and rejection by the others. Though some studies indicate that patients with transient enuresis may often be salvaged for service,[4] the most practical approach is to observe and document the symptoms while the patient is on duty or in the dispensary and then to refer him for psychiatric evaluation.

In contrast, homesickness of varying degrees of severity is regularly present in large numbers of recruits. More overt symptoms include crying spells, somatic complaints or excessive fatigue. The medical officer and chaplain can provide superficial therapy with counselling, reassurance and encouragement. Superiors can be of assistance by keeping the men busy with work, which acts as an antidepressant. By and large these symptoms are transient and usually disappear in time; more severe cases can be referred to a psychiatric facility.

(2) *Suicidal attempts.* One of the most difficult decisions a doctor in service will face is what to do with a patient who has recently made a suicidal gesture. How serious was the attempt, how depressed is the patient, is it likely to be repeated—these are not easy questions for the officer called to see a man in a small dispensary at two o'clock in the morning. Psychiatric consultation may not be feasible, yet a decision must be made which may be of lifesaving importance. To make

matters worse, decisions in this area are difficult even for the experienced psychiatrist, for there are no hard and fast rules.

The only generalization that can be made is that a majority of the suicidal attempts that are seen at St. Albans, at least, are in the nature of gestures rather than serious attempts. Most are manipulative in intent—to avoid duty, spite a superior or a loved one, or get out of the brig. Many are associated with alcoholic intoxication; relatively few are secondary to true neurotic depressive reactions. It is for this reason, by the way, that they are classified here with the personality disorders rather than under the neuroses.

A typical example is a youth with six months service who is rejected by his girl friend or is in trouble with the authorities; he gets drunk and then slashes his wrist or consumes half a bottle of aspirin. After being taken into custody he threatens to repeat the action unless he is transferred to another duty station, discharged from service, or otherwise appeased. On the other hand, he may deliver an extremely convincing tale of woe that completely disarms the well-meaning medical officer or chaplain.

In practice, this is the type of patient who seems to cause the doctor the most concern, whereas in fact it is just this type that almost never has serious suicidal intent. The policy on our own psychiatric service is that after appraisal of the patient psychologically and attention to any physical needs, such as gastric gavage or the bandaging of a wrist, he is treated with a matter-of-fact, firm attitude, given an opportunity to ventilate some of his pent-up hostility, and subsequently returned to duty with a clear indication that such behavior is inappropriate, can lead only to administrative difficulty, and is not a means to accomplish the desired end. A definite percentage may be expected to return to the hospital eventually, but the majority are not repeaters.

The patient that presents a real danger, on the other hand, is the older man with a number of years of service who becomes depressed and makes a gesture. On examination, he may seem resentful and self-debasing, or may apologize profusely with considerable embarrassment. The patient's promises never to act this way again can lead an unsuspecting doctor into a false sense of security; such a patient may well be successful the next time. In general, one should be wary of a man with a long period of successful service and should search intensively for factors causing disequilibrium; the short timer, on the contrary, is most often a manipulator.

Regardless of type, however, all such patients need constant observation and protection, whether in the barracks, dispensary, or brig. Psychiatric consultation should be obtained whenever available. If not, the behavioral pattern of the manipulator ordinarily becomes more and more apparent after a few days; usually after his anger subsides, he may be returned to duty. All others require definitive hospitalization.

(3) *Sociopathic personality disorders.* The largest group of personality disorders are of "psychopathic" or sociopathic type. These include many of those who feel they cannot tolerate the service, go A.W.O.L., constantly complain or disrupt routine, or are in disciplinary difficulty. Referral by the administrative authorities to the medical department usually follows a suicidal gesture, functional or feigned somatic complaints, "anxiety reaction," or "depressions" characterized by pouting, petulance, and thinly veiled manipulative threats.

A careful and scrutinizing history obtained both from the patient and from other sources is crucial if the doctor is to be alert to the many distortions and deceptions in the story. Otherwise he may miss the diagnosis of a sociopathic personality and try to treat a would-be anxiety syndrome. Psychiatric techniques have been dishearteningly ineffective in dealing with these personality disorders, and our prisons, reformatories, and increasing crime rate only serve to remind us continuously of our inadequacy. It is the unusual case treated under ideal circumstances that may respond to treatment.

To complicate matters, there is still con-

siderable controversy whether these are illnesses at all. That this is more than a mere exercise in semantics is evidenced by the medico-legal problem of culpability for an offense. If every behavior deviation were considered to be strictly a psychiatric problem, the disciplinary structure of the military would quickly crumble and its psychiatrists inundated with patients.

For the most part the medical officer can only be an adjunct to the administrative authorities. He can lend reassurance and counselling to the offender, indicating what his general problem seems to be (*e.g.*, a lifelong struggle with authority figures), but must also indicate nevertheless what the regulations require. In the final analysis it is still up to the man himself whether he does or does not choose to obey. Many doctors go astray in consequence of their own feelings of guilt. Punishment in itself is antipathetic to physicians' charitable feelings, and the doctor feels anxious and guilty if he does not in some way "rescue" the offender from what is actually his just due.

The overpermissive medical officer can also create a problem for himself by encouraging the ever-present tendency of disciplinary authorities to use the hospital or dispensary as a confinement barracks or brig. In brief, unless examination findings suggest the presence of mental disorder, other than personality defects *per se*, problems of this kind should be handled administratively.

Why not, one might reasonably ask, just discharge all of the behavior problems from the service? Many, in fact, are released through administrative channels or by means of a Board of Medical Survey. On the other hand, as has been discovered repeatedly, too lenient (and inevitably inconsistent) a discharge policy not only can lead to a manpower shortage, but also creates further problems in discipline and morale.[5]

Once the word spreads that misbehavior or continued medical complaints can lead to an easy discharge, offenses increase at an alarming rate. Any psychiatric facility located near a disciplinary barracks is acutely aware of this, but it is important to bring to the attention of both general medical officers and those of the line that automatic discharge on the basis of a personality disorder is not an answer to the problem by any means.

(4) *Sexual disorders.* The group of sexual disorders, while composed of a multitude of mixed types, is classified under the personality disorders as the majority of cases seen in the military are of this type, though impotence, which is more properly thought of as neurotic in origin, is listed here for purposes of convenience.

Impotence is not an uncommon complaint. Just as with enuretics, these patients most often are sent initially to the urologists, who in turn refer them to psychiatry because of the infrequency of organic causes. The symptom is a most distressing one, more so in that the doctor is usually at a loss to treat it.

Unless there is an obvious organic etiology, such as a spinal cord lesion in multiple sclerosis, the difficulty in many cases stems from deep seated conflicts involving aggressive feelings and so-called "castration anxiety," which are often difficult to treat unless psychotherapy can be arranged under favorable conditions. Treatment in the dispensary depends partly on environmental circumstances. If a man is on duty in an isolated area or at sea, he is best treated by supportive reassurance that there is no organic disease and that the symptom may well remit spontaneously. This will usually suffice temporarily since under such conditions there is little opportunity for sexual activity anyway.

If the patient is living with his family, however, and faced with his problem constantly, an attempt at physical treatment, along with reassurance, should be made. The patient may be instructed to abstain from sexual activity for several days and then to attempt coitus with a partly distended bladder. Nux vomica in doses of seven milligrams (or 0.5 milligrams of pure strychnine) along with five milligrams of dexedrine taken a half hour prior to coitus may be helpful. If after several weeks there is

no improvement, psychiatric consultation should be obtained when convenient. Only seldom, however, is definitive psychotherapy possible.

The sexual perversions, including pedophilia, voyeurism, exhibitionism, etc., are symptoms of marked disturbances in personality development. In most cases the patient has been apprehended after a sexual offense and is being retained by the authorities pending trial and/or psychiatric evaluation. Requests for the latter ordinarily come directly from legal sources, and the general physician is not often involved at all.

The perversion most problematic to the military because of its relatively greater frequency is homosexuality. The services have been criticised frequently for what is thought to be a rigid and harsh attitude toward the homosexual. While no arguments are intended for or against the existing regulations, it is only fair to point out that the rigid policy of discharging all homosexuals from the service stems in great measure from the needs and structure of military life. The homosexual creates a morale problem in that he is such a psychological threat to most servicemen that their anxiously defensive feelings of disgust and fear may provoke retaliation against the offender. When the doctor is confronted with an accused homosexual, he need do no more than to perform a physical examination prior to confinement and to release the man back to the authorities. They in turn will routinely request psychiatric clearance for an administrative discharge.

IV. Functional Somatic Symptoms

Somatic symptoms of functional origin can be among the most frustrating and difficult to manage conditions facing any physician. The variations in presenting symptoms are endless, and their etiology runs the gamut from psychotic delusions to frank malingering. The most common picture is a mild, but persistent complaint which is more or less disabling and, hence, a source of repeated visits to sick-call; headache, dizziness and fainting, backache, and multiform gastrointestinal symptoms top the list in frequency.

There are four cardinal rules to the management of these conditions:

(1) A complete physical examination is essential not only for the patient's sake but for the doctor's as well. One simply cannot be firm in one's convictions and in convincing the patient that his headache, for example, does not stem from a cerebral neoplasm unless one has performed an ophthalmoscopic examination. A complete physical examination reassures the patient, indicates to him that the doctor is not content to brush off his complaints with a cursory prescription, lends confidence to the doctor's own diagnosis, and permits his dealing with the problem for what it is.

(2) Once no organic pathology has been found, a physician may react with annoyance. This stems both from his feeling that if the patient is not "really sick," he should not be complaining, and also from the feeling of frustration inherent in the doctor's inexperience or inability to deal with the problem. The patient senses the annoyance and in turn reacts defensively. Then there follows the endless succession of visits to sick call that medical officers know so well; these result partly from the patient's genuine desire for help and also from his conscious or unconscious resentment toward the doctor, whom he continues to torment by failing to improve! The important thing to remember is that even though one does become resentful, one's own awareness of the fact, alertness to its consequences, and at least an effort to control its conscious manifestations will be helpful.

(3) Additional history in the form of personal and social factors becomes necessary once organic causes are excluded. One should look for specific circumstances which might be leading to symptom formation—new duty assignments, increased responsibility, transfer orders, trouble with other personnel, the approach of retirement, or the thinly veiled or even conscious manipulation for secondary gain.

(4) Treat both the soma and the psyche. If a man has headaches, give him aspirin, ice bags, ergotamine, etc., for the pain. Plan to see the patient again; it is better to tell him to return at a definite time (which implies one's interest) than to make him demand further treatment for continued symptoms. Reassure him definitively that no organic condition is present and indicate firmly that no further studies are indicated. Avoid using the phrase, "It is in your mind," or, "You're imagining it." This just irritates or frightens the less sophisticated patient; it will panic a borderline psychotic; and the manipulator gets a clue to adjust his symptoms accordingly. A more tactful way of phrasing things might be as follows: "Look, Jones, after examining you completely, I can reassure you quite definitely that your complaints are not due to any physical disease, such as a tumor or infection. On the other hand, something seems to be going on (*i.e.*, whatever the particular situation happens to be) that is making you tense (or giving you a headache, etc.), and I think we can try to give you some relief with that part of the trouble."

As long as the functional nature of the disorder has been established, in the minds of the patient and espccially the doctor, then the treatment of the symptom itself with a mild remedy is often very helpful. A plain, old-fashioned tonic, for example, given to patients with vague complaints can be good treatment as long as the doctor knows what he is trying to accomplish. Even a simple remedy may provide a patient with reassurance, a feeling that the doctor is doing something, and a face-saving device that assuages somewhat the discomfiting notion that it is "all mental."

However, it must be emphasized that it is just in cases like this that diagnostic evaluation from a psychological standpoint is so essential. For example, to prescribe medicine for a sociopath may imply that the medical officer is hedging because he is not entirely sure in his own mind that the problem is functional; this gives the patient additional room to manipulate. Medicine may fix the symptoms of a neurotically dependent woman and make her even less able to face the psychological factors. A trace of the bizarre in symptomatology may spell the ruminations of the chronic ambulatory psychotic; while medicine may provide a psychological boost, a prior diagnostic appraisal would obviously be very important.

In summary, what is suggested is that each case is different, the treatment of psyche and soma will depend on the individual circumstances, and that this will require as careful an evaluation by the medical officer as possible. Since from a quarter to a half of his patients may be of this variety, psychiatric consultation for all of them is not possible; proper diagnosis right in the dispensary itself will be the keynote to the treatment of most of these problems.

One final word concerns the use of tranquilizers, not only in patients with functional somatic complaints, but in all those with neurotic or personality disorders. In general, the frequently indiscriminate use of these drugs should be avoided. Tranquilizers more often than not do not relieve the symptoms, may complicate matters and aggravate them, and at times are definitely contraindicated. It is better, in the case of a somatic complaint, to direct the remedy toward the specific symptom *per se,* such as aspirin for headache, and deal with the causes on a psychological basis, rather than to use haphazardly a drug that is potentially noxious.

A case that illustrates this point was a youth admitted to the hospital complaining of tachycardia and palpitations. He was given a thorough diagnostic workup, complete with electrocardiogram and laboratory studies, and a diagnosis of paroxysmal auricular tachycardia was tentatively entertained. He was unresponsive to treatment for this disorder, however, and when further studies were found to be negative, his symptoms were thought to be of functional origin. Accordingly, he was started on tranquilizers for his "anxiety," but these were not effective in relieving his symptoms either. Ultimately, after more attention was given to

the personality factors, a lifelong history of psychopathic behavior was obtained—marital infidelity, mounting debts, creditors at the door, impregnation of a paramour, and a long chain of falsehoods in an attempt to escape the inevitable pressures. As the end of the line approached, the patient became anxious and developed palpitation and tachycardia. Under such circumstances, it is hardly a wonder! Tranquilizers were ineffective because two of the cardinal rules of treatment were neglected: a search was not made for underlying psychological factors prior to therapy, and an attempt was made to treat the soma without the psyche, *i.e.*, to treat the symptom of anxiety while the causative emotional conflicts remained unaltered.

V. Alcoholism

To make a sweeping generalization for practical purposes, one can divide alcoholism as it pertains to dispensary management into two types: *acute and chronic*. Acute alcoholic intoxication, called "drunkenness, simple" in the nomenclature, is usually managed by allowing the patient to sleep off the effects of the intoxication. Intramuscular promazine (Sparine) will control agitation, and the patient is returned to duty following recovery. Chronic alcoholism, on the contrary, is no less difficult to treat in the military than it is in civilian practice. One is usually limited to exhorting the patient to join Alcoholics Anonymous and applying administrative pressure. Disulfiram (Antabuse) can be obtained in dispensaries at the request of the medical officer, but this should be used only under constant supervision.

If the alcoholism is severe enough to interfere with duty, then psychiatric consultation will be necessary; this is often handled through administrative channels. A serious complication of chronic alcoholism, other than its debilitating aspects both physically and psychologically, is delirium tremens. Hospitalization and treatment with promazine, fluids, and vitamins is almost always necessary.

Another problem related in many ways to that of chronic alcoholism is that of narcotics addiction. This is uncommon in the service; most suspects examined at our hospital are not true addicts, but are men who will go to any extreme, even false self-incrimination, to obtain some secondary gain, such as discharge from service. If called upon to examine a narcotics suspect, the doctor should be alert to tell-tale needle marks, pupillary reactions, and vasomotor signs. These should be reported accurately for record purposes. N-allyl-nor-morphine (Nalline) can be administered cautiously for conclusive evidence of withdrawal phenomena. With these procedures accomplished, assuming the patient is not an addict, he may be returned to the proper authorities. If he is an addict, hospitalization is necessary.

VI. Psychiatric Problems in Dependents

The medical officer not infrequently will be confronted with psychiatric conditions in dependents of active duty personnel. These disorders cover the entire range of psychiatric illness, and their management is beyond the scope of this paper. The problem essentially is similar to that in any general practice of medicine. Military installations large enough to have dependents nearby will often have one or more military psychiatrists available if consultation is essential. In other areas civilian psychiatrists may be within commuting distance.

The main problem involves dependents ill enough to warrant hospitalization. If military facilities are not available, as is usually the case, except in specialized centers, dependents should be referred to private or state institutions close by. U. S. Public Health Service hospitals in certain locations will accept dependent personnel with psychiatric illnesses. Civilian institutions ordinarily are very cooperative in hospitalizing dependents provided they are apprised of the details of the situation, both with regard to the patient's condition and the unavailability of military facilities. The medi-

cal officer is naturally the crucial link in the establishment of a satisfactory liaison.

SUMMARY

In this paper the author has tried to outline the most common types of psychiatric disorders likely to confront a general medical officer during his tour of active duty. It is not meant to be all inclusive; it is meant rather to serve as a guide to the detection, basic treatment, and disposition of the types of patients the doctor will meet every day. A basic assumption implicit in the philosophy of such a guide is that the general physician will take over the role of a part-time psychiatrist, since consultation for all of these patients is not feasible. That medical officers who are properly oriented can be effective part-time psychiatrists has been amply demonstrated by the high level of performance of some known to us personally who have since left our hospital for independent duty assignments. In essence, the problem is that of being a good general practitioner, a very difficult but not impossible task.

Bellevue Psychiatric Hosp.
400 E. 30th St.
New York 16, N.Y.

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CLOSING IN ON THE PROBLEM

One out of every 12 Americans will be hospitalized for mental illness at some time in his life. Half the hospital beds in the country are used for the treatment of such illness.

These statistics, while startling, give an extremely inadequate description of the suffering caused patients and their families by mental illness. Probably no other disease so completely disrupts family life or is responsible for such intense distress over long periods of time.

We have only begun to attack the problem of mental illness. Recent progress will have real meaning only if it encourages us to learn more about the causes of these disorders, and to concentrate more medical manpower and related services on diagnosis and treatment of the mentally ill.

GEORGE BUGBEE, President Health Information Foundation in *Progress in Health Services*, Vol. IX, No. 8, October 1960.

The Army Mental Hygiene Consultation Service

By

FREDERICK B. REMINGTON, M.D.*

INTRODUCTION

THE mission of the Army Mental Hygiene Consultation Service is to assist Command in the conservation and effective utilization of military manpower through the application of sound mental health principles, and to provide the best professional services possible for the evaluation, treatment, and disposition of the individual showing signs of maladjustment or mental illness.

This is an account of the author's experience in establishing a Mental Hygiene Consultation Service at an Army post in the United States.

AS IT WAS IN THE BEGINNING

At the time of the author's arrival at the post, the Neuropsychiatric department was located in the hospital. The staff included a social work officer, a civilian social worker and two enlisted social work specialists. There was no field work program and all referrals, be they psychiatric or neurological, came to the hospital where they were first seen by the social worker for history-taking and then by the psychiatrist. This resulted in a wasteful duplication of effort by both parties as well as unnecessarily over-burdening the secretary with the typing of similar duplicate reports. In addition to these deficiencies, there was as yet no stockade screening program, with the result that the majority of prisoners were not seen by the psychiatrist at all, or if they were, it was necessary to accompany them to the hospital ward under armed guard. The operation was in essence a Neuropsychiatric Service without a ward, attempting to do the job of a Mental Hygiene Consultation service with inadequate staff, inadequate location and office space, wasteful duplication of professional and secretarial effort, and no field work program to bring psychiatry to the most needed areas—the infantry, the post stockade, the Service School, and other smaller units.

A DIFFERENT THEORY OF MENTAL HYGIENE CONSULTATION SERVICE OPERATION

In January 1960 a representative of the staff was invited to attend a series of meetings in Washington, D. C., during which the most recent thoughts, policies and procedures on Mental Hygiene Consultation Service operations were presented. Although many worthwhile ideas were brought back, probably the most useful was the principle of having the social work staff function as a "first line of defense" for the clinic, utilizing the psychiatrist as a *consultant* alone. Implicit in this theory of operation is recognition of the fact that the well-trained social worker is a professional person in his own right. Since his talents partly parallel and overlap those of the psychiatrist, why should the already overworked psychiatrist be required to do the work which the social worker can adequately perform? A more efficient arrangement would be to allow the social worker and his staff to operate as a mobile, active first line of contact with referrals, calling in the psychiatrist only on cases where his special skills and training are required. Many cases so handled can be adequately disposed of by the social worker alone and merely discussed with the psychiatrist. Lest this proposal be considered radical, let it be recalled that the majority of civilian court and welfare agencies operate on just this theory of operation, i.e., that the social workers and administrative personnel run the clinic, and the psychiatrist is used as a consultant only on selected cases. It was with this principle in mind, then, that we reorganized our program, with the prospect of a much more efficient use of personnel, a more intimate contact with the patients and their referring

* Department of Psychiatry, College of Medicine, State University of New York (Upstate Medical Center), Syracuse 10, New York.

superiors, a saving of time for the complete clinic staff and—not the least important—a much deeper sense of personal achievement and satisfaction for all concerned.

Reorganization

After adopting this basic philosophy, the problem which presented itself was essentially one of implementation. Our first need, of course, was to establish adequate communication with staff and command, to enlist their interest and acceptance of the new field work program, and set up the practical "ground rules" for each area of operation. Their response and acceptance of our program was quick and gratifying. The Army Service School located on the post immediately made a private office available for interviews in the School, and called together all responsible personnel for an orientation on the details of the program. The Infantry Brigade on the post cooperated fully. Our reception by the staff at the post stockade was equally good. The Confinement Officer arranged for a special office to be built for the examination and interviewing of stockade prisoners. Our initial fears that the proposed field work program would be regarded skeptically were never realized. The response was immediate from all quarters, almost with a "we've been waiting for this" attitude.

After this acceptance, we set up teams to handle each area of activity. As the School was a more technical operation, we felt it could be handled effectively by our civilian social worker, and accordingly, he set up daily appointment hours for referrals, assisted by two of the enlisted social work specialists, with the Chief of the Mental Hygiene Consultation Service available for consultation on all problem cases. Referrals were made either directly to the social worker by the students or by the NCO's or Commissioned Officers in charge. One pleasant surprise was the invitation extended by the School for the psychiatrist to sit as an advisor on the Faculty Board to which failing Service School students were referred. His collateral information and advice on these problem students was given considerable weight by the school officials in making appropriate disposition of cases.

The Brigade program, our second largest source of referrals, was organized similarly, with the social work officer and two other social work enlisted men acting as initial contacts for the program. The Unit Commanders and NCO's soon began to call the Mental Hygiene Consultation Service freely to arrange for consultations in the unit, and often offered their own offices for interviewing. The Assistant Chief of the Mental Hygiene Consultation Service was made psychiatrist in charge of this aspect of the program, and was called upon by the social work officer whenever cases were seen which could not adequately be handled by the social worker on a case-work basis alone.

Our third source of referrals, the post stockade, was handled differently than the other areas mentioned. The number of referrals was quite large and a detailed evaluation on every man was impossible. Accordingly, we planned to "screen" the prisoners. For this function, neither our civilian social worker nor our social work officer was required. We used one enlisted social work specialist to prepare background information on each confinee under the close supervision of a social work officer. Both psychiatrists participated in the stockade program, using the background history prepared by the enlisted social work specialist to evaluate the prisoner. Thus, in the stockade program we again avoided duplication of effort on the part of the professional social work staff and psychiatrists.

With the establishment of screening programs in the Service School, the Infantry Brigade and the stockade, there remained only a heterogeneous group of "direct referrals." This group, which constituted only a small fraction of our total patient load, included direct in-patient referrals by ward doctors, a few self-referred dependents, occasional referrals from ROTC programs or distant recruiting stations, and all the purely neurological patients. Since this group was small, it was, for the most part, handled by the psychiatrists directly, without a prelimi-

nary work-up by either the professional social worker or the enlisted social work specialists. Once again, a duplication of effort was avoided, and as a result, personnel were released for necessary work in other areas.

Results

The results of our reorganization were dramatic. We found that the clinic was able to serve many more units and men than before because we were no longer wastefully duplicating each other's efforts. Since we were now "in the field," we reached patients and their Commanders whom we would previously have been unable to help. Because many of the social work contacts were now on a "screening" basis, write-ups were more brief than previously and did not duplicate the psychiatrist's work. This enormously reduced the typing load on our secretary and enabled evaluations to be returned to their referring sources more promptly. In addition, psychiatrists, social workers, and especially enlisted personnel, felt a greater sense of personal achievement and responsibility than they had previously experienced under the "old" system.

Summary

A practical way of realizing the goals of preventive psychiatry has been illustrated in the reorganization of a Mental Hygiene Consultation Service in accordance with principles of modern social psychiatry. The social worker is used as a professional in his own right, with the responsibility for all initial contacts with patients and Unit Commanders. Under this plan, the psychiatrist is used as a consultant only, if and when needed, although all cases were reported to him whether seen by him or not. The advantages of this form of organization are manifold. They include more effective contact with the patient and his unit, the avoidance of wasteful duplication of effort, a greatly decreased load on secretarial staff, and a greater sense of achievement and responsibility for all clinic staff members.

Emotional Dysfunction and the Use of Psychopharmacological Drugs in a Military Theater

By

LT. COLONEL MARTIN B. GIFFEN, USAF, MC*

THE psychopharmacological drugs have made rapid inroads into the field of medicine in recent years. While these drugs have not been the exclusive property of psychiatry they nevertheless have found their greatest use in this specialty. At this time there are in common use about 30 different drugs. The exact amount that are dispensed either by prescription or over the counter is difficult to estimate. The expenditure for these drugs runs into the hundreds of millions of dollars.

In the practice of medicine there is no clinical specialty that does not deal daily with syndromes caused by emotional turmoil. It has been estimated that approximately 50% of the complaints presented to general practitioners, nonpsychiatrists, stemmed in part from emotional or mental turmoil.[1] Since it is impossible to staff medical installations with individuals trained in psychiatry and because of the distances and time involved in transporting individuals requiring specialized care and treatment, it becomes necessary for nonpsychiatrists to initiate treatment. The psychotherapeutic drugs have an important and accepted place in the treatment of the emotionally ill. With their use many of the symptoms can be relieved. Yet, to select the proper agent is at times difficult because of the number available, the lack of familiarity with these drugs, and the possible concern over the side reactions. In those patients we have received from outlying installations the diagnosis has been accurate in a high percentage of cases, but the treatment has been homeopathic in nature. Individuals have on occasion been given medication which could aggravate rather than relieve the symptoms.

CLASSES OF DRUGS

The Psychopharmacological drugs can be grouped into the following classes:

1. The Neuroplegics, used primarily for psychomotor agitation, represented by the Phenothiazine Derivatives and Rauwolfia Alkaloids.

2. The tranquilizers, for the reduction of tension states represented by the Diphenyl Methane Derivatives and substituted Propanediol Group.

3. Antidepressives, the Hydrazines and Impramine.

The pharmacology, the site and mode of operation of these drugs are still for the most part speculative; however, they do cause remarkable changes. In a great majority of cases disappearance or reduction of symptomatology occurs. The literature describing their activities, actions, success or failure is voluminous. There are many conflicting reports even within the same journal as to the effectiveness of these drugs.

It would be a Herculean task to give a detailed description of each drug in these various classes. Our discussion will be limited to those drugs which are obtainable through normal Air Force supply channels and those which we have in our clinic become familiar with by repeated administration.

THE PSYCHOTIC PATIENT

The psychotic patient is best treated by a specialist in the field of Psychiatry. As with any disease the earlier effective treat-

The opinions expressed in this paper are those of the author and do not necessarily represent those of the Department of Defense or the Department of Air Force.

*Chief Psychiatric Service, USAF Hospital Wiesbaden, APO 633, New York, N.Y.

ment is started the sooner resolution of symptoms occurs. Since the delay between the admission hospital and the psychiatric center may involve upwards of ten days in many instances, it becomes necessary for the first medical officer to see the patient to start treatment. The diagnostic group making up 96% of all our psychotic admissions are the schizophrenics. The activity of schizophrenics range from bizarre acting out, hallucinatory and delusional thoughts and feelings, suicidal ideation or at the other end of the scale complete withdrawal to a catatonic-like stupor. In between there are all stages of autistic activity from the one end of the spectrum to the other. The drugs which we have found to be the most beneficial in treatment of this belong to the Phenothiazine group.

There are at present in common usage 12 derivatives of the basic phenothiazine nucleus. These are obtained by substitution at two places, the carbon atom at 2 position or the nitrogen atom at the 10 position.

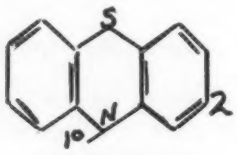

FIG. 1

The tail of the compound, at the 10 position is either an alipathic or aromatic chain. (Piperadine or Piperazine rings.)[2]

These variations have claims of greater margins of safety, greater effectiveness and potency, rapidity of action and specificity for the chronic patient. As with any medication, the drug chosen must be given in sufficient amounts if improvement is to occur. No hard and fast rules can be made either as to a single drug for all patients or a standard dosage.[3] The greatest percentage of our patients are in the acute stage of their illness without chronicity. We have found Thorazine to be the most effective among the Phenothiazines. It has been our policy to start with 300-400 mgm per day. If improvement is not forthcoming in 3 days, we increase the daily dosage by 100 mgm until improvement or extra pyramidal symptoms occur. Then the dose is reduced by 50-100 mgm or may be maintained and anti-Parkinson drugs given. In the extremely hyperactive patient, intramuscular injections of 50 mg are repeated in one hour, then every 3 hours until the activity subsides. The intramuscular injection of 50 mg seems to be as effective as 100 mg orally.

Promazine (Sparine) has proved less effective in the treatment of the psychotic disorders. The potency range is estimated from ½ to ¼ that of Thorazine.[4] Seizures occur more frequently with Sparine than with any of the other Phenothiazines.[5] Blood pressure reduction with Sparine appears less prominent; therefore, some observers feel it is safer to use it in the treatment of alcoholic states. The dosage in the treatment of acute alcoholic excitement is 200 mgm I.V., repeated.

Compazine appears to offer a better result than Thorazine in the withdrawn and apathetic patient. With its use patients become more alert and interested in their surroundings. Its actions in reducing symptoms appear to be faster than Thorazine and we have not had the frequent complaint of grogginess, that is heard so often with thorazinized patients. The dosage utilized in our clinic is 10 mgm t.i.d. increasing by 10 mgm until 80 or 90 mgms are reached.

Our experience with Vespirin, Trilafon and Stelazine has been limited. Reports in the literature tend to indicate that these drugs appear to be more beneficial in the chronically ill patient. In the few chronically ill among our dependent population we have found Stelazine to offer better results than the other two drugs. It would appear that the substitution of the aromatic rings not only increases the potency and speed of action of these drugs but also causes a push or activation of the patient. Stelazine is given in dosages of 5-15 mgm a day. Some observers feel that it produces dramatic alleviation of hallucinatory and delusional trends.

The Phenothiazines in varying degrees

present similar side reactions and toxic states. The side effects are not always directly correlated with dosage but may occur at any time during the course of the treatment. The more disturbing ones usually make their appearance, however, after 10-14 days. (Thorazine, Sparine.) With administration the patients may complain of various degrees of drowsiness, weakness, dizziness, dry mouth, nasal stuffiness and blurring of vision, various degrees of hypotension may occur. This is more prone to occur with I.M. injection of Thorazine. Care, therefore, should be taken with repeated I.M. medication. The hypotension is usually not serious and with continued medication the patient's blood pressure stabilizes. If the drop is significant and supportive measures are necessary, elevation of the foot of the bed usually suffices. No adrenalin is to be given. If medication is necessary a nor-adrenalin agent is indicated. Tachycardias are also more likely to occur with I.M. Thorazine. What is more distressing to the patient, is the development of extra-pyramidal symptoms. This may be an ataxia, motor restlessness, dystonias, or Parkinsonism. The dystonias may be spasm of the neck muscles, extension rigidity of the back muscles, carpopedal spasms, trismus and oculogyric crises. Compazine, Trilafon and Stelazine are more prone to produce extra-pyramidal signs. The treatment of these signs consists of lower dosage, reassuring the patient, and anti-Parkinson drugs. The highest incidence of convulsive seizures have occurred with Sparine. Dermatitis and photosensitivity are at times a problem in climates with abundant sunshine. Thorazine and Vespirin may cause sufficient reaction to require discontinuance. The more serious complications of the Phenothiazines are their ability to produce changes in the blood elements. Cases of agranulocytosis have been reported with the use of Thorazine, Sparine, and Vespirin.[4,5,6] Periodic blood counts should be taken when these medications are used. The Phenothiazines potentiate the action of narcotics, alcohol, and sedative drugs. There have been reports of liver involvement with the use of Thorazine and Sparine. So far the cases I have experienced have been mild and are reversible.

There are now available sustained release capsules of Thorazine and Compazine. These have many advantages in the treatment of the psychotic patient.[7] And they have proven an effective medication in Air Evacuation channels.[8]

The Rauwolfia Alkaloids while little used today in the treatment of the major psychiatric illnesses, nevertheless deserve mention if only historically. The dosage necessary to produce a change in the symptoms result in extrapyramidal symptoms and marked hypotension with frequent syncope. The incident of improvement is far less than with the Phenothiazines.

The Alcoholic States

In case of delirium tremens, alcoholic hallucinosis, "alcoholic shakes," and the hyperactivity of drunkenness, the Phenothiazines offer an effective method of combating the symptoms. Thorazine, Compazine, and Sparine have all been utilized. We rely on Thorazine. With the excitable, difficult patient, we give 50 mgm Thorazine I.M. repeated in one hour, then every 3 hours until the patient becomes less active. In addition other supportive methods are instituted. Usually with the first dose, the patient becomes manageable. In one case of "alcoholic shakes" with severe gastritis we controlled the pain and nausea with a newer compound, Librium 25 mgm q.i.d. Within 3 hours the pain subsided and after 6 hours, the patient was comfortable. The tremors were remarkably reduced in 3 days.

The Depressions

This era in the future history of medicine may well become known as the Psychochemotherapeutic age. With the early findings of the effects of Reserpine and Phenothiazines on mental symptoms one would expect that sooner or later these agents would be used on patients who exhibited signs and symptoms of depression. Unfortunately, it was soon noted that Reserpine not only pro-

duced depression but would aggravate already existing depressions. The Phenothiazines were equally ineffectual. Marsilid first used in the treatment of tuberculosis had listed as one of its side reactions a stimulating ability. This was considered deleterious. Marsilid might have been consigned to oblivion had not other observers noting this action, started investigations on the depressed.[9] Early reports favorably commented on improvement in the depressed patient. This led to the development of other drugs having similar pharmacological properties. At present there are 5 Monoamine Oxidase inhibitors in use (Marsilid, Nardil, Catron, Niamid, Marplan). These vary in potency, side effects, and effectiveness. Another group of compounds unrelated in their action to the monoamine oxidase inhibitors have also gained wide usage; Tofranil, more closely related in structure to the Phenothiazines, and Ritalin. The difficulty in evaluating these drugs lies in part in the difficulty of the term and syndromes of depression. The preponderance of the literature testifies to the effectiveness of these drugs in varying degrees, in the endogenous group of depression while subjective depressive symptoms and reactive depressions appear to be affected less favorably. Among our patients we see very few that fall into the endogenous group of depressions, *i.e.* the manic-depressive psychosis, and the involutional psychosis. The greatest preponderance of patients exhibiting signs and symptoms of depressive illness belong to the neurotic groupings, schizophrenics, or those individuals who express dejection or apathy rather than true depression. Others react to environmental stress with depressive withdrawals which clear rapidly and many times spontaneously. Our experience has been limited to the use of Ritalin, Niamid and Tofranil. The most effective of the three in our hands has been Tofranil. Dosage has ranged from 25 to 100 mgm t.i.d. A favorable response begins with a gradual regaining of interest in oneself and the environment. Appetite and sleep patterns improve. Where there has been suicidal ideation and self depreciatory thoughts, the patients first become unconcerned with them. These then fade away. In the occasional agitated depression or the schizophrenic with depressive features, we have combined Ritalin and Tofranil with either Thorazine or Compazine. Tofranil and Thorazine so far have proved satisfactory in the treatment of these mixed symptom complexes.

The side reactions of this group even though dissimilar in chemical structure have many effects in common. The antidepressants in varying degrees of severity produce hypotension, visceral atony, increased psychomotor activity, insomnia, sweating, weakness, edema, blurred vision, to mention but a few. The most serious is hepatic involvement. Marsilid has produced acute yellow atrophy of the liver. Severe dermatitis has been reported in a few instances, as have seizures with Tofranil. More of the side effects occur if the dosage of Tofranil is above 200 mgm a day.

The Neurotic Groupings

Within this group the symptoms compelling treatment are those of anxiety and depression. Yet in this area the spectrum of drugs available prove less effective when compared with the relief of symptoms among the psychotic groupings. When anxiety is "free floating" and is in response to "specific" environmental stress, many drugs lower the titer. The drug most frequently utilized for this is Equanil or Miltown. The dosage is from 400 mgm t.i.d. to q.i.d. Thorazine in doses of 25 to 100 mgm a day has also been used. A new drug Librium 30-100 mgm a day has also shown promise. However, the barbiturates have also stood the test of time and remain effective in many cases. Except for the acute almost panic like states, psychotherapy offers more towards the reduction of symptoms than the tranquilizers. The effectiveness of these drugs appears to bear a close relationship to the maturity of the personality. The more unstable the basic core is, the less effective

these drugs appear. Patients who show little overt anxiety, obtain inconsistent relief from medication. In the chronically anxious, attempting to maintain a homeostatic balance, by utilizing somatic mechanisms, also report fair to poor results. In the obsessional patient unless the tension was great, I have had dubious results. As mentioned in the depression, the reactive or neurotic depression responded less favorably to the antidepressive drugs. These drugs should nevertheless be utilized since many do show some lessening of the depressions.

The psychophysiological reactions present the most refractory group in so far as their response to the psychopharmacological drugs. This may be in part due to the numerous diagnostic procedures this group is subjected to in an effort to reach a diagnosis. Thereby many iatrogenic fixations occur. Psychogenic vomiting responds well to Compazine either tablets or Spansules, 10 mgm spansules have proved effective in most instances. The chronic psychogenic neuromuscular reactions show little improvement with Equanil or the Phenothiazines. Recently in patients presenting gastrointestinal complaints of "stomach knots," cramps and pain, we have had excellent results with a newer drug Librium. This drug in the few patients we have tried it on, with chronic tension, fatigue and mild irritability and restlessness, has given some good results.

In the neurotic group medication is only of secondary import. Of prime import is instituting some form of psychotherapy. Without this it is questionable, if much benefit will be derived from any medication. The psychotherapeutic drugs are not to be construed as a substitute for adequate psychotherapeutic help.

When Equanil was first introduced, it was hailed as an ideal drug, effective without side effects or toxicity. With increased useage and more careful observation, toxic reactions were noted. Reports indicate the following reactions have occurred with Equanil: hyperpyrexia, malaise, vomiting, headache, cardiac dysrhythmias, hypotension with shock, edema, purpura, restlessness, diplopia, and coma. Addiction has occurred with prolonged use. Equanil potentiates alcohol, barbituates, and antihistamines. Ritalin can produce a shock-like condition with all the concomitant symptoms.

The psychiatric center which we operate has a fixed number of beds (47). These are divided into 10 female, 13 closed male beds, and 24 open male beds. We cannot increase or change this figure. Our admission rate per month averages 84. As can be seen immediately we must completely empty our section at least twice a month. The average patient stay is 12 days. We can by no stretch of the imagination indulge in long term treatment plans. With the spectrum of drugs available to use we can and do relieve a high percentage of symptoms. With these drugs we can within the first few days of hospitalization start the patient on constructive planning whether it be continued military service or return to civilian life. With early and adequate medication by outlying medical units even better results can be obtained.

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Acute Ulcer and Space Safety: A Summary of Opinions*

By

LT. COLONEL EDDY D. PALMER, MC, U.S. Army

NOW that space travel is imminent, the possibility must be considered that a unique ulcerogenic situation is being created. Whether or not one believes that the problems which may face an astronaut would be especially conducive to "stress ulcer", he must agree that the mere implications of the thought require some consideration. An ulcer hemorrhage or perforation in a space vehicle would spell disaster for the individual concerned, for a hugely expensive effort, for an important research project, and for the chronology and possibly even the initiation of a great many other research projects.

This question is raised for several reasons. Space travel, now emerging as an almost certain feature of the very near future, is a uniquely exciting prospect. Its newness in fact is strangely old in fiction—in fiction which for years has used as its main theme a great number of terrors, threats, unexpected dangers and terrible frustrations. Space is the last great Unknown and Unknown equates with the maximum in anxiety.

There are some features of space travel which must be considered particularly stressful, in addition to its newness, uncertainties and insecurities. Aloneness, loneliness, and boredom are foremost among these. Human companionship, perhaps the major antistress factor in this type of adventure, will presumably be absent at the start and severely curtailed for some time.

Almost as important will be the physical restraint that space suits and space vehicles will impose upon astronauts. A recent issue of Time Magazine (1) reports: "These Buck Rogers (space suits) make good pictures, but all a man can do in one is sit and twiddle knobs. It takes him a good 30 seconds just to lift his hand from his knee to the top of his head . . ." Space vehicles themselves must necessarily prove extremely restricting, especially in view of the fact that projected space flights call for weeks or months of travel. The importance of simple physical constraint for production of acute gastroduodenal ulcer is strikingly demonstrable experimentally. Many investigators have found that mere incarceration of rats for several hours in a tubular cage which prevents physical activity—rather reminiscent of a space vehicle—is a simple and sure method for producing acute ulcers.

RESULTS OF A QUESTIONNAIRE

In order to obtain opinions on the validity of supposing that acute gastroduodenal ulcer may be a space threat, a brief questionnaire was sent to 70 recognized gastroenterologists. An effort was made to select correspondents who have a special interest either in ulcer or in the problems of space travel. The latter group was rather small but it included some qualified flight surgeons and two physicians who have been selected as Medical Monitors for Project Mercury.

Obviously this could not be a compendium of opinions about space travel—gastroenterologists don't study this subject. Rather, it was an effort to learn current thoughts about stress ulcer. It must be explained, too, that no problems were meant to be solved—just opinions to be had. As one correspondent wrote, "I fear that the results of (this) questionnaire would give figures which are based upon no knowledge."

The mere thought behind the questionnaire aroused enough interest so that 28 of the 61 physicians who answered took the time and trouble to write a letter in addition to the questionnaire, and give detailed ex-

* From the Gastroenterology Service, Brooke General Hospital, Fort Sam Houston, Texas.

planations and often lengthy discussion. Only one correspondent voiced a completely negative attitude and his thought was a very curious one: "I am not of the opinion that this is the time to create any undue apprehension about space travel."

Do you think that the stress ulcer problem should be considered a real threat to the success of space travel?

Yes—32
No—12
Undecided—7

Is everyone potentially susceptible to acute stress ulcer?

Yes—32
No—11
Undecided—8

Those who answered negatively to this question tended to qualify their answer, along lines expressed by the correspondent who wrote, "Everyone responds to stress in some manner, especially if it is sufficiently pronounced or long-standing. Where and how it may manifest itself is another matter."

Is it possible by selection to eliminate people who are especially susceptible?

Yes—27
No—12
Undecided—12

Those who believed this not possible tended in their comments to view the elimination process rather superficially, as, for example, "We've all seen ulcers in people who appear to be as stable as the Rock of Gibraltar and not so many in anxious neurotic patients." This attitude seems to imply a missing of the stress ulcer point. The comment expresses, in fact, the very reason why stress ulcers must be considered a problem in space projects.

If so, would this best be done by psychometric examination?

Yes—18
by gastric secretory study?
Yes—17
by gastric motility study?
Yes—2
by all?
Yes—8

Two correspondents suggested eliminating candidates who demonstrate gross bleeding after histamine-insulin stimulation. One would eliminate candidates with blood type O and suggested measurement of the parietal cell mass as a screening procedure.

Does preflight conditioning promise real prophylaxis against acute stress ulcer?

Yes—33
No—8
Undecided—10

A physician who is a Medical Monitor of Project Mercury answered, "Yes—clearly." On the other hand, a Flight Surgeon wrote, "If one may use the example of our flight personnel at the present time, I would say no." A common comment took this line: "Not before exact nature of expected stresses is understood for design of pre-stress testing and selection."

Is there any other practical prophylactic move?

hypnosis?—3
antacid and antisecretory drugs?—16
ataractic drugs?—3
vagotomy and pyloroplasty?—2
gastric cooling?—2
gastric radiation?—1
none—14

There were many comments to this question. Some correspondents wonder whether prophylactic moves shouldn't be concentrated on the preflight period, since the anxiety of anticipation may be worse than that of the flight itself. Several mentioned that some of the suggested prophylactic moves, especially the drugs, would certainly interfere with other important physiologic responses during flight. One comment pointed out that the candidate would probably have a dry mouth already, without the need for an anticholinergic. To the suggestion regarding prophylactic vagotomy and pyloroplasty, one cor-

respondent exclaimed, "What an awful thought!"

Discussion

If there was a clearly unanimous opinion among the gastroenterologists who took part in the poll, it was that we know practically nothing about ulcerogenesis. "It seems to me that if the physical scientists can learn to send a man into space in the span of a few short years, we should have been able to figure out what causes ulcers in 50 years. It's time doctors became scientists instead of faddists and hunch-worshippers."

"If these few sentences seem to be inconsistent and incongruous, this gives you the present status of things. How can one come to any conclusions as to the predictability of ulcers during stress?"

"It's going to take a tremendous expenditure of money and time by many people to find the answer, and I don't think it's going to be found in the way or along the lines that present day research in gastroenterology is going."

The candidness of the correspondents and their insistence on professing ignorance of the stress ulcer problem were truly remarkable. It was made quite clear that, in spite of the fantastic economic burden that ulcer imposes on all modern societies and in spite of ulcer's general popularity as a research subject, there is still no solid basis for industrial or military recognition of susceptibles, for planning prophylactic moves, or even for deciding whether one need worry about ulcer as a threat in future planning.

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The Accurate Measurement of Neuromuscular and Musculoskeletal Disabilities

By
A. W. SCHENKER, M.D.

(With eleven illustrations)

THE accurate appraisal of neuromuscular and musculoskeletal disability stands out as a major challenge to industrial medicine today. The Winchelism "Guesstimating", jangling though it is to the sensitive ear, very aptly describes a common practice familiar to everyone to whom the care of these disabilities is entrusted.

In the "Manual for Medical Examinations of the Veterans Administration"[3] specific guidelines are laid down for the measurement of range of motion and deformities. The purpose of these guidelines is to supply adequate information to members of the Rating Board who are entirely dependent on this information for their determination of disability ratings. The importance of such measurements is further emphasized by "A Guide To The Evaluation of Permanent Impairment of the Extremities and Back."[1] This has been compiled by the American Medical Association Committee on Medical Rating of Physical Impairment. It contains numerous statistical tables in which various impairments are combined and related to give percentage relationship of the smaller part to the next larger part, etc., so that it may be expressed in terms of impairment of the whole man.

Both of these publications stress the importance of relying on precise measurements of range of motion and deformity as the only certain way of arriving at fair determinations of disability. In the American Medical Association publication methods of measurement are described in detail of every articulation of the extremities, neck and back, and accompanying each of these measurements is an example for calculating percentage of impairment for every ten degrees of lost joint motion. Similar tables are given for ankyloses. In connection with spinal impairment, values are given in steps of 1%. An elaborate combined values table is given which is based on the formula A% + B% (100% − A%) = combined values of A% and B%. By means of this table two or more combined disability values may be calculated.

All of this presupposes that the actual measurements of range of motion and deformity are at least within clinical range of accuracy. However, the methods of measurement as described in detail in these publications are not only basically erroneous but are in a number of cases misleading.

The measurement of range of motion and deformity is important not only for determining the degree to which the patient is currently disabled but also for the way in which he responds to treatment. For this reason, accuracy in making such determinations is of prime importance. Hitherto, range of motion and deformity determinations have depended almost solely on the principle of the protractor type goniometer. This implies that the anatomic center of rotation is a fixed entity for any given articulation. Actually no bodily articulation is even remotely a purely rotatory one. We are prone to think of the elbow, for example, as the purest type of hinge joint in the body. But even a cursory study reveals that this articulation, though to a lesser extent than most of the others, is not only rotatory but linear as well. The best example of rotatory and linear motion resides, of course, in the temporomandibular joint. And to complicate matters further, all articulations move not only in the plane of rotation but in other planes as well. What makes this so is the fact that the periarticular structures maintaining the integrity of the joint consist of soft tissues—capsules, ligaments and muscles or tendons. These of necessity yield in all directions as

muscle contractions about the joint occur. There are other anatomical reasons why the protractor type goniometer is basically inadequate for the correct measurement of range of motion and deformity. In fact, the protractor type goniometer is so unreliable that the clinician with wide experience in estimating such measurements, may develop a sense of judgment which is no less dependable than that of the protractor type instrument.

However, the measurement of range of motion or deformity of the trunk, the neck, pronation and supination of the forearm, etc.—these render the use of the protractor type goniometer completely useless, but estimating such movements even by the experienced clinician must be less than satisfactory because of the absence of rigorous objectivity.

The question occasionally arises as to how important it is in daily practice to take range of motion and deformity measurements at all. Why should it be necessary to take these measurements with a high degree of clinical accuracy? We all recognize the importance of recording temperature, pulse, respiration and blood pressure. These are quantitative measurements which are mandatory because life itself may be dependent upon them. Deranged motion and musculoskeletal deformity present disabilities which to the patient are of paramount importance primarily because it may interfere with taking care of his daily physical needs or with his earning a livelihood. From the medicolegal standpoint the need for objectivity is too obvious to require emphasis.

Those of us whose concern it is to treat such patients, are interested in his rate of improvement and only a few degrees increase in range, which cannot otherwise be detected, will assure us that the treatment technique we employ is the correct one. Moreover, the patient's knowledge that he has truly gained those few degrees may be enormously helpful to his morale.

What constitutes good goniometry? Photometry and X-ray techniques have been tried and abandoned, if for no other reasons than their awkwardness, expensiveness, lack of availability and above all, lack of accuracy. A good goniometer must be simple to apply and easy to read directly without interpolation. As in the taking of blood pressure, no assistance should be necessary. The instrument must be light, since it is often applied to a weak extremity. It must be compact and sturdy. Its use must be reasonably independent of any bony or other anatomical landmarks because of their gross variations and ambiguous delineations, that is, poorly defined points of reference. Above all, it must be accurate within clinical limits of observation. Such an instrument, measuring to an accuracy of plus or minus 2 degrees, was described by Schenker.[2] This instrument, however, falls short of the mark in that it is poorly adapted to measure range of motion of the fingers and not at all for the measurement of deformity such as flexion contractures, ankyloses, etc.

Using the fluid principle again, a new goniometer has now been devised by the author which has a dual function. With it, range of motion of any articulation in the body, including the phalanges, may be measured to an accuracy of $\pm 2°$. With it also, any musculoskeletal deformity may be measured to the same degree of accuracy.

Preliminary studies with this goniometer suggest that our past concepts of estimated normal ranges of motion of the various articulations are erroneous. For example, abduction to shoulder level from the fully adducted position is usually estimated at 90°. Numerous readings taken with this goniometer indicate consistently that normal abduction ranges to shoulder level are rarely as high as 90°. The average normal abduction range is closer to 70°–80°. Similar studies have been made with other joints, all of which indicate that our current concepts along these lines require reappraisal. Thus, with accurate goniometry now at our disposal, it may be useful to set up a research project to establish new normal values for range of motion of every articulation as a basis for comparison in deranged joint motion and deformity. The principle of operation is based on gravity acting on a sealed

column of fluid thereby maintaining a constant horizontal level independent of the range through which it rotates. By rotating a transparent, calibrated circular housing containing the fluid from position A to position B, the angle subtended between A and B constitutes the angle of rotation. Thus, if the fluid level in position A is at 1 and after the fluid housing is moved through to position B about C as the center, the fluid level assumes the new position 2, then the angle ACB is equal to the angle subtended between 1 and 2. (Fig. 1)

This is true regardless of the location of the fluid column along the length CA. The plane of the fluid column is always perpendicular to the axis of rotation.

The instrument consists of a sealed plastic circular housing, 2¾″ in diameter and 5/16″ thick. It weighs 45 grams. (Fig. 2)

The housing is entirely transparent and contains a pigmented fluid which takes up less than half its volume. At its facial periphery is a calibrated scale in 2 degree intervals. Overlying this face is a hairline indicator which is freely rotatable concentrically with respect to the circular housing. This hairline extends across the full diameter of the housing. At one peripheral end of this hairline a magnifier is incorporated which enlarges the calibrations and numerals for adequate visualization even in a relatively poorly lighted room.

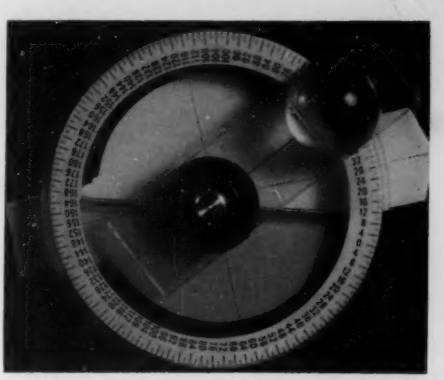

FIG. 2. The fluid dual goniometer.

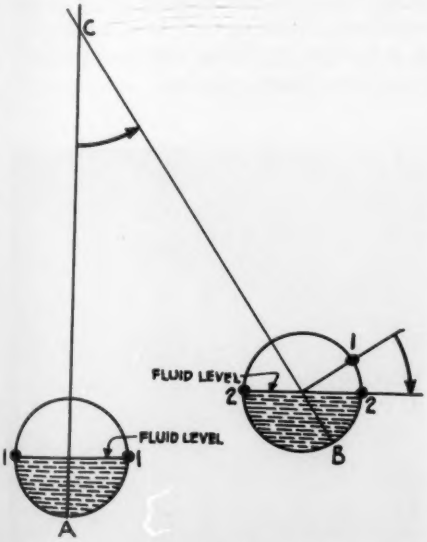

FIG. 1. Diagram illustrating principle of operation.

Against the opposite face of the fluid housing an opaque round disc is attached which rotates freely and concentrically with respect to this transparent housing. This disc has a 5/8″ wide prolongation extending ¾″ beyond its opposing peripheral edges along a line drawn thru the disc's center. One end of this longitudinal extension is pointed and the opposite end is flat. Along the entire length of this prolongation a hairline is etched. This line starts at the flat end of the extension and, passing through the center, it terminates at the pointed end. Another line is etched on this disc at right angles to the line just described. It passes through the center and ends at the diametrically opposed peripheries. These etched lines are clearly visible through the transparency of the calibrated window. The function of these lines is so designed as to afford readings directly off the instrument without the need for calculations.

MEASUREMENT OF RANGE OF MOTION*

The detailed procedure for the measurement of the range of motion may be illus-

*A monograph on Goniometry is currently in preparation by the author.

FIG. 3. Shoulder abduction.

trated by the selection of a given articulation, e.g., shoulder abduction. It is advisable to practice this with a subject whose range of motion and strength are within normal limits. The subject stands with his back against a flat wall and his shoulder (right or left) is abducted to a convenient angle, say about 40 degrees. (Fig. 3)

With this position of the upper extremity a mark is placed on the wall corresponding to the dorsal surface of the hand placed at right angles to and touching the wall at about mid-metacarpal of the 5th finger.

(1) Wrap rubber strap to arm just above wrist.

(2) Attach goniometer to radial aspect of forearm by inserting the flat end of the disc extension between the rubber strap and the arm.

(3) Place arm in adducted and relaxed position, (arm hanging freely at side).

(4) Rotate fluid housing until fluid level is approximately at zero.

(5) Move magnifier so that its etched line coincides with the zero on the dial. This establishes the fully adducted shoulder in the zero position.

(6) Abduct shoulder to the mark on the wall.

(7) Move magnifier line until it is parallel to the new fluid level.

(8) Read. This reading represents the abduction range of the shoulder.

It is advisable to repeat these readings no less than 3 times. Always re-establish zero before abducting the shoulder. None of the three repeated readings should exceed plus or minus 2 degrees. If they do, it is an indication that the handling of the instrument may have been faulty or that the patient has either not maintained his stance or has been substituting.

The instrument is specifically designed so that when the magnifier line is moved it does not cause corresponding movement of the fluid housing. Nevertheless, in handling the instrument, reasonable care must be taken to see that the magnifier does not move accidentally in relation to the fluid housing and vice versa. Regarding substitution movements of the patient, ordinary clinical vigilance is the sole criterion.

MEASUREMENT OF DEFORMITY

The detailed procedure for measurement of deformity may be illustrated by describing its application to any specific deformity, e.g., spinal list, as in sacroiliac disorder. The technique is as follows:

(1) Patient in standing position, with his back to observer, head flexed forward to render spinous process of C-7 more prominent and, using skin pencil, a mark is placed over the crest of each spinous process from C-7 to L-5. All these points are now joined by one line. (Fig. 4)

(2) Place goniometer with arrow of disc prolongation pointing to right of midline and its etched line coinciding with the pencil outline of the spinous processes.

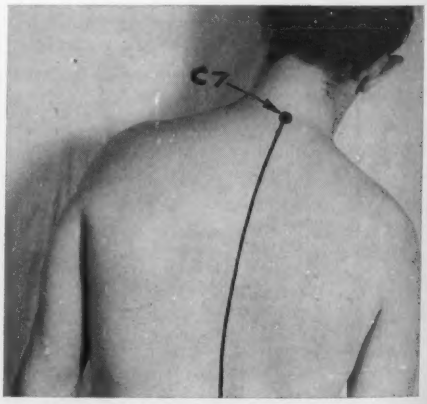

FIG. 4. Outline of spinous processes.

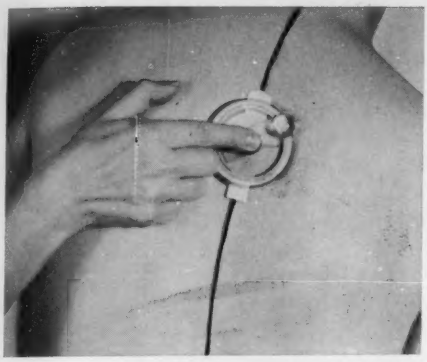

FIG. 5. Application of goniometer showing spinal list.

(3) With etched line held securely in this position, rotate fluid housing until fluid level is approximately at zero.

(4) Move magnifier so that its etched line coincides with zero on the dial. This establishes the verticality of the body stance as in the zero position.

(5) Move magnifier line until it coincides with etched line marked "deformity from vertical axis" seen through the window of the fluid housing.

(6) Read. This reading represents the angle of list of the trunk with the vertical. (Fig. 5)

While the foregoing examples illustrate techniques for the measurement of range of motion and deformity in specific instances, each movement or deformity calls for its own slight modification peculiar to that particular movement or deformity. In any case, the basic approach is the same in all measurements and the results should never exceed the tolerance of plus or minus 2 degrees.

As a matter of interest, Figures 6, 7, 8, 9, 10 and 11 are introduced to illustrate a few

FIG. 7. Flexion and extension of head.

FIG. 6. Lateral bending of head.

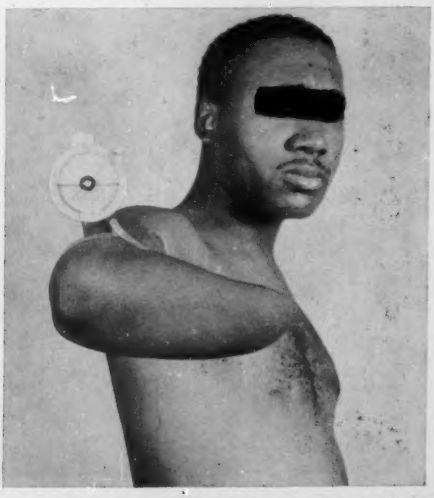

FIG. 8. External and internal rotation of shoulder.

FIG. 9. Pronation and supination of forearm.

applications of the fluid goniometer in situations where the protractor type of goniometer is utterly useless.

FIG. 10. Lateral bending of trunk.

FIG. 11. Forward flexion of trunk.

SUMMARY

The medical rating of physical impairment of the neuromuscular and musculoskeletal system requires accurate objective measurement of function. The techniques of measurement currently available are inadequate. The primary reason for this is that dependence for such measurement has hitherto resided largely in the protractor type of goniometer. Since accuracy with this type goniometer is dependent solely upon localization of the center of rotation of the joint and since such localization is practically impossible to repeat with any degree of clinical accuracy the method is basically unsound. In other words, the error is extrinsic and is in no way related to the variations inherent in individual observations.

Photometric systems and X-Ray techniques have been tried but abandoned for reasons of awkwardness, expense, etc. The technique here described utilizes a fluid level

principle which, in the measurement of range of motion, is totally independent of any surface anatomical landmarks, thereby avoiding inaccuracies due to poorly defined bony points of reference or other ambiguous anatomical localizations. By eliminating the need for landmarks, this technique provides an accuracy of plus or minus 2 degrees. Moreover, the instrument is adapted to measure within the same tolerance, fixed deformities of most articulations of the body. The instrument is light and sturdy and has incorporated within it a magnification means enabling the observer to obtain readings even in a poorly lighted room. Preliminary studies with this instrument indicate that past concepts of normal range of motion standards are erroneous. Accordingly, a research project is suggested to establish new standards of range of motion.

U. S. Army Dispensary
90 Church St.
New York 7, N.Y.

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[3] U.S. Printing Office, Revised June 1951.

ARMY NURSES CELEBRATE 60TH ANNIVERSARY

Around the world members of the Army Nurse Corps and their friends recently celebrated the 60th Anniversary of their Corps. Here shown is the cake cutting ceremony at Seoul, Korea.

U. S. Army Photo

LT. COL. MARY C. JORDAN, Chief, Nursing Section, 7th Logistical Command and COLONEL JAMES A. WIER, Chief Surgeon, Eighth U. S. Army, cut the anniversary cake.

Pulmonary Tuberculosis in United States Air Force Personnel and Their Dependents in Japan, Okinawa and Korea in 1958 and 1959*

By

COLONEL HARTWIN A. SCHULZE, USAF, MC† AND M/SGT. JOSEPH W. OUTLAW, USAF

THIS study is based on records available in the Clinical Records Library of the Tachikawa USAF Hospital. These records consisted of the "Clinical Record Cover Sheet," DD Form 481-3, and the "Narrative Summary," Standard Form 502 (6-Part). Since this hospital serves as the Air Evacuation Center for patients originating in Japan, Korea, and Okinawa, it includes all military patients evacuated to the United States during this period. It also includes two military patients who were treated as outpatients and two who were further hospitalized locally. The study includes all civilians who were evacuated to the United States, nine civilians who were treated as outpatients, and seven civilians who were further hospitalized.

MILITARY PATIENTS

There were 44 patients in this group giving an average annual incidence of 0.6 per 1,000 persons. In comparison, during 1957 and 1958, the U. S. Army had a worldwide average incidence of 1.0/1,000/year for all forms of tuberculosis.[1,2]

It will be noted that almost half of the cases came to treatment while in the minimal stage.

In order to shed light on the question of where these infections were acquired, whether in the PACAF area or prior to arrival, cases were tabulated according to time of diagnosis after arrival in PACAF. The results are shown in Figure 1.

TABLE 1

MILITARY PATIENTS (44) CLASSIFIED BY STAGE OF DISEASE

Stage of Disease	No. Cases	% Cases
Minimal Active Tuberculosis	21	48
Moderately Advanced Active Tuberculosis	22	50
Far Advanced Active Tuberculosis	1	2
TOTAL	44	100

In considering these data, it must be borne in mind that the average person serves in this command for only a few years.

Since the rapidity of evolution of pulmonary tuberculosis varies greatly from case to case, no precise conclusions can be reached concerning the time and place of contracting the disease in most of the cases, but it seems reasonable to conclude that the 9 minimal cases discovered after 20 months residence were contracted locally. The data available do not permit any conclusions as to place of infection in the other cases.

Cases were tabulated according to age and seemed to correspond to the age distribution of the military population, but because of the small numbers involved, the significance of this is not established.

Broken down by race, 10 of the 44 patients were classified as Negroid. The others were Caucasians. Since Negroids represent only 10-15 per cent of the military population, the Negroid cases are disproportionately high. Furthermore, only one of the 10 Negroid cases was minimal, while the other 9 were moderately advanced. Of the 44 patients, only 3 were officers and they were classified as minimal.

In an attempt to ascertain what factor was

The opinions expressed in this paper are those of the authors and do not necessarily reflect those of the Department of Defense or the Department of the Air Force.

* From 5th Epidemiological Flight (PACAF).

† Col. Schulze's present address is: USAF Hospital, Hill Air Force Base, Utah.

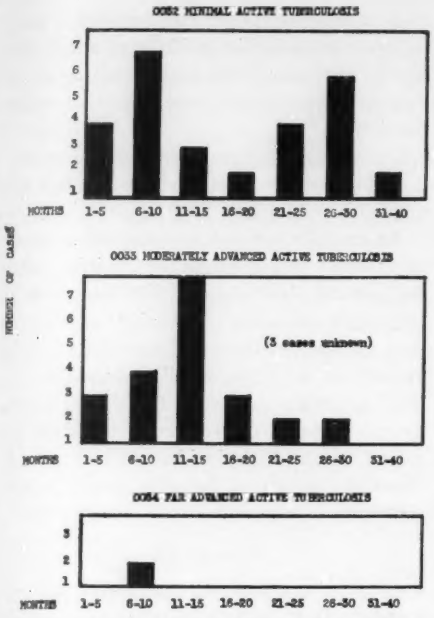

FIG. 1. Pulmonary tuberculosis in PACAF Military Personnel in Japan, Korea, and Okinawa, 1958-1959, tabulated according to time of diagnosis after arrival in PACAF.

responsible for diagnosis, cases were tabulated according to the reason which brought them to medical attention; that is, whether they came to attention because of symptoms or because of findings on a routine x-ray done for such reasons as reenlistment examination, hospital admission, food handler's examination, etc. Symptoms brought about diagnosis of 10 of the 21 in the minimal group, 14 of the 22 in the moderately advanced group, and the one case in the far advanced group. The other 19 cases, about 43%, were discovered through routine x-ray examinations.

NON-MILITARY PATIENTS

During this two-year period, 47 civilians, that is, dependents and civilian employees, were treated for pulmonary tuberculosis at the Tachikawa USAF Hospital, giving a rate of approximately 1.0/1,000/year.

This distribution is similar to that for military persons.

TABLE 2

DISTRIBUTION OF NON-MILITARY CASES (47) ACCORDING TO STAGE OF DISEASE

Stage of Disease	No. Cases	% Cases
Minimal Pulmonary Tuberculosis	25	53.2
Moderately Advanced Pulmonary Tuberculosis	19	40.0
Far Advanced Pulmonary Tuberculosis	3	6.8
TOTAL	47	100.0

One of the far advanced cases was a 41-year-old civilian employee, who apparently had galloping consumption with symptoms beginning only five months previous to admission. He had been in Japan since 1946. The other two were old cases previously treated in the United States. Both were dependent wives; one negroid, the other Japanese.

Among the 19 moderately advanced cases, 16 were dependent wives and 3 were children. Of the 16 dependent wives, 14 were orientals, one was Negroid, and the other was Caucasian. Two of the 3 children were Negroid, and one was a Caucasian. Thus, only 2 Caucasians were in the entire group.

Among the 25 minimal cases, 21 were orientals, 3 were Caucasians, and the remaining one a negro. They were all dependent wives, except a Red Cross worker and 3 children. Two of the 3 children were Japanese and the other was an adopted orphan from Korea.

Among the 47 civilian patients, there were only 6 Caucasians.

Most of the dependent wives appear to have developed their tuberculosis between the time of their premarital physical examination, of which chest x-ray is a necessary part, and the examination required for obtaining a visa for emigration to the United States. In many cases, this interval consisted of a number of years. Of course, some cases may have been missed on premarital x-ray and there is also the possibility that some prospective brides who knew they had tuber-

culosis employed a friend to serve as substitues for the x-ray picture taking.

The most striking feature of these cases was that 36 of the 47, or 75% were orientals. It is not known what proportion of dependents are of oriental origin, but it is doubtful if it is over 25%.

Discussion

According to the World Health Organization, the death rate for all forms of tuberculosis in the 15- to 44-year old age group (which corresponds with the military population) in Japan was 60.3/100,000 population/year during 1964-1956.[3] This rate is about eleven times as high as that in the United States during the same period.[3] If crowding and economic conditions are considered the most important predisposing factors for the development of tuberculosis, the rate in the Okinawan population is probably about the same as for Japan. The rate in Korea is probably much higher.

From these facts alone, it would be reasonable to expect that the incidence among military personnel stationed in these countries would be considerably higher than among military personnel in the United States. This study does not substantiate this, but it must be remembered that tuberculosis is rather slow in making its presence manifest, and, because the period of service in this command is rather short, persons might contract the disease and the disease not become manifest until after their return to the United States.

Even though there is a high incidence of tuberculosis in the indigenous population, the average military person is rather well shielded from this hazard. Household servants and other indigenous employees of the U. S. military are well screened for tuberculosis and most military persons do not have close personal or domiciliary contact with the natives. Not one case was discovered in this study in which the disease in a military person was traced to a specific tuberculous native. This may, however, be due to the fact that the records from which the study was made were incomplete. Furthermore, a military person would be unlikely to admit that the disease came from such a source if the circumstances of the contact were otherwise clandestine.

One case was found in which an airman probably became infected from another airman—his roommate.

An annual chest x-ray of dependent wives of oriental origin might be fruitful, since the present data suggest that the yield of previously unknown cases might greatly exceed the one per thousand regarded by some authorities as economically acceptable for mass screening surveys in the United States. Certainly the medical officers should be apprised of the high incidence of disease in dependent wives of Japanese origin so that their suspicions are aroused more readily.

Summary

A study was made of pulmonary tuberculosis among United States Air Force personnel and their dependents in Japan, Okinawa, and Korea during 1958 and 1959, using the records of the Tachikawa USAF Hospital's clinical records library. Since this hospital serves as the aeromedical evacuation center, the study includes all patients from these areas evacuated to the United States. It also includes patients further hospitalized in the Far East and those treated as outpatients.

Included in the study are 44 military patients giving a morbidity rate of 0.6/1,000/persons/year. The true rate of infection may be considerably higher because some cases may not have become manifest until after their return to the United States. One patient was in the far advanced stage, 22 moderately advanced, and 21 were minimal. A disproportionately high number of cases occurred in negroids and of the 10 negro cases, 9 were moderately advanced.

There were 47 non-military patients constituting an estimated rate of 1.0 per 1,000 persons per year. The distribution according to stages of disease was about the same as in the military groups. Of the 47 patients, 36 were of oriental origin, mostly dependent

wives. In the majority of these, the disease appeared to have developed between the time of the premarital chest x-ray and the x-ray required for visa prior to emigration to the United States.

Attention should be directed to the early detection of tuberculosis in dependent wives of oriental origin.

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PUBLICATIONS

The U. S. Senate International Health Committee of which Senator Hubert H. Humphrey is Chairman, has announced that the following medical publications are now being printed:

"Radiation Research in The Life Sciences"

"Hearing on Coordination of Federal Biomedical Research"

"Parts II and III—Appendix to Hearings on International Medical Research and Medical Assistance"

To obtain copies of the above address send your request to:

Medical Research Project,
Old Senate Office Bldg., Room 162,
Washington 25, D.C.

A Poison Information Center for American Armed Forces in Europe

By

ROGER P. SMITH, PH.D.

THE USAREUR Poison Information Center, which began operations early in November of 1958, occupies two unusual if not unique positions within the framework of the American Association of Poison Control Centers. Its location at the USAREUR Medical Laboratory, Landstuhl, Western Germany, is responsible for frequent inquiries about European products, while the predominately military character of the population which it serves often leads to inquiries about products which are probably rarely encountered by civilian centers.[1]

With the exclusion of the above, those American military installations in Europe which possess dependent facilities, closely resemble American communities in the United States. While the choice among brand names at U. S. Forces shopping facilities is usually limited, it was anticipated that the American home in Europe contains many of the same products, medications and potential hazards as its North American counterpart. We had, therefore, no reason for predicting that the statistical incidence of poisoning cases would differ radically between the two locations except that an unknown percentage of inquiries would involve European products, and another unknown percentage would involve items more or less indigenous to the military.

The Center is staffed by the company grade officers of the USAREUR Medical Laboratory. This group of from ten to fifteen officers represents a wide gamut of scientific specialties related to medicine including pathology, veterinary medicine, biochemistry, toxicology, bacteriology, virology, epidemiology, entomology, parasitology, serology, sanitary engineering and blood banking. The laboratory and reference facilities which accompany each of these disciplines are available to the Center.

Although this is an Information Center, devoid of treatment facilities, it is an integral part of Landstuhl Army Medical Center which also contains a 1000 bed general hospital equipped with an artificial kidney and the usual array of emergency and supportive treatment facilities.

The Dilemma of European Products: Table 1 is a compilation of European products encountered during the first eighteen months of operation of the USAREUR Poison Information Center. The most surprising aspect of this heterogeneous collection of products is that with only a very few specialized references and a modest collection of the standard English works, we were able to furnish any information on ingredients or toxicity at all. The fact was that we were able to contribute some information on by far the majority of the products encountered, but this can only be regarded as an extremely fortuitous circumstance.

Although we began to accumulate information on European products from the date that we began operations, this aspect of our activities has never been an active program. A start was made by attempting to index all European products which had gained sufficient popularity among American personnel to be sold in U. S. Armed Forces retail outlets in Europe. This did not by any means represent a large group of products, and many were already labelled as to their ingredients. Eventually, as our services became better known, particular groups such as schools, would submit products obtained locally and under consideration for use to

From the Chemistry Department of the USAREUR Medical Laboratory, APO 180, New York. Dr. Smith's present address is the Department of Pharmacology and Toxicology, Dartmouth Medical School, Hanover, New Hampshire.

This paper was presented at the Third Annual Meeting of the American Association of Poison Control Centers, October 18, 1960, Chicago, Illinois.

TABLE 1

CASES INVOLVING EUROPEAN PRODUCTS

Group	Product	Country of Origin of Product	Notes
Medicinal Items	Chinin Hydrochlorid	Germany	The German for quinine HCl. This was procured locally and taken in an attempt to induce abortion.
	Persedon	Germany	Also Presidon, Hoffmann LaRoche; chemically it is 3,3-diethyl-2, 4-dioxo-tetrahydropyridine. Available in 200 mg. tablets, it is widely used as a tranquilizer. It is sold in the U.S. as a syrup, Sedulon (Roche). It bears the same structural relationship to Doriden as phenobarbital does to barbital, but apparently is less toxic as shown below:[3] LD50 Doriden 500 Persedon 1000 Sedation 50 200 Doses in mg./kg. in mice.
Household Items	Asef Blumendunger	Holland	Plant food or fertilizer in compressed tablet form which contains ammonia, nitrates, phosphates and potash. The tablets are first crushed and dissolved in water.
	Essigessenz	Germany	German generic term for a commonly employed vinegar concentrate (about 80% acetic acid) which is sold as such and diluted as needed for household use.
	Sampell	Germany	Product containing detergent, glycerin, water and perfume which is used to soften brittle finger nails.
	Walker's Lab Cleanser	England	
	Arpege	France	Perfume made by Lanvin
	Ecusson	France	Perfume made by Jean Albert
	Essence of Omar Khyam	Egypt	Perfume made in Cairo
	Unknown product for paint and varnish removal	Germany	
	Liquid from glass globe containing snow scene	Germany	This particular product appeared to contain water (lab. analysis), but the name of the manufacturer could not be found.

TABLE 1 (*Continued*)

Group	Product	Country of Origin of Product	Notes
Economic Poisons	Giftweizen	Germany	German generic term for a type of rodenticide made by coating wheat or other grain kernels with either zinc phosphide or thallium.
Miscellaneous	Knallerbse	Germany	Common name (literally: torpedo) for the white berries from a common ornamental shrub. The berries make a popping noise when stepped upon.
	Laburnum	Germany	This plant indexed by the National Clearinghouse is also native to Germany.
	Gasoline	Germany	An epidemiologically unconfirmed report of a case of aplastic anemia supposedly precipitate by excessive exposure to local gasoline, which reputedly contains large amounts of benzene.

our laboratory for toxicological evaluation. If this information could not be derived by correspondence with the manufacturer, the product could be submitted to a chemical analysis in an attempt to determine its ingredients. This position of having a Poison Center associated with a large laboratory enabled us not only to examine some products chemically when other means of deriving information were not fruitful, but was in several instances of great value when acutely poisoned patients were admitted to the adjacent hospital and the nature of the intoxicant was not known. We were successful in some cases in identifying toxic agents from biological specimens while the patients were undergoing symptomatic and supportive treatment.

Some Peculiarities of the German Pharmaceutical Industry: Table 2 illustrates the rather surprising disparity which exists between the German and American prescription requirements for some drugs common to both countries. Where these six drugs have rather stringent restrictions as to their availability to the general public in the United States, at least three of them must be regarded as being readily available to the public in Germany. Whether or not this has any effect on the incidence of drug intoxication as opposed to other types of agents among the German population remains for the present speculative, but it is suspected that this situation plays an important role in intoxications among American personnel stationed in Germany. We know that in some if not all of these cases the item was obtained on the German market and the patient either inadvertently or intentionally ingested an overdosage. Certainly it appears that some of the cases listed in Table 2 deserve inclusion among those attributable to our European location.

Many proprietary items in Germany as well as in the United States enjoy a wide popularity. The activities of our Poison Center were often hampered by the fact that many of these items are not indexed by standard sources, and they are often unlabelled as to ingredients. It is a common practice for many "apothekers" to formulate their own proprietary preparations which sometimes gain a large local following. Several compounding houses even exist for the express purpose of preparing these tailor-made medicaments and issue catalogues of ingredients

TABLE 2

A COMPARISON OF GERMAN AND AMERICAN PRESCRIPTION REQUIREMENTS FOR SOME COMMON DRUGS INVOLVED IN CONSULTATIONS REFERRED TO THE USAREUR POISON INFORMATION CENTER

Product	No. of Cases	German Rx Requirements[a]	American Rx Requirements
Meprobamate	5	a	c
Glutethimide	2	a	c
Tripelennamine HCl	1	a	c
Phenmetrazine HCl	1	b	c
Heptabarbital	1	b	c
Ergotamine tartrate	1	b	c

a Rx not required.
b Initial Rx may be refilled indefinitely.
c Rx required; refills at M.D.'s discretion.

TABLE 3

CASES INVOLVING PRODUCTS ASSOCIATED WITH THE MILITARY

Product Type	Notes
Fire extinguisher	Automotive type which is found in all military vehicles; probably contains carbon tetrachloride.
Rifle bore cleaner	R. M. Hollingshead Corp., Camden, N.J., Meets Federal Specification 2-117.
Rifle bore cleaner	Fidelity Manufacturing Company, Allentown, N.J. Meets Federal Specification 2-117.
Insect repellent	6 parts Dimethylphthalate 2 parts 2-Ethyl-1,3-hexanediol 2 parts Indolone
Insect repellent	2-Ethyl-1,3-hexanediol
Moth proofing spray	Active ingredient was lindane
Preservative for pipe interiors	A type of pipe which is usually used for petroleum products was laid as an emergency water line into a local village. The question of the toxicity of the interior preservative naturally arose.
Possible exposure to selenium fumes	Patient inhaled the fumes from some burning electronic equipment which was known to contain selenium rectifiers.
Smoke bomb	Exposure to fumes to hexachloroethane
Methylethyl ketone	Splashed in eye of patient
Brasso metal polish	Nine cases of ingestion of this commercial product were reported.

from which the druggist may choose. The ingredients are usually limited to those items which do not require a prescription, but it has already been demonstrated that this restriction is not necessarily a major safeguard against potent medicinal agents.

Some Unique Features of the Military Population Group: Table 3 represents a compilation of consultations on products associated in some way with our military population. Products indigenous to the Army represent a compounded problem for those who try to accumulate a file of information about their ingredients. Not only are these products rarely labelled as to constituents, but since their chief description is usually an official specification concerned with the use of the product, ingredients often vary from one source of supply to another within the framework of the specification. This is well illustrated even within our modest collection of cases. Note the two cases involving rifle bore cleaners with the same stock number, but made by different companies. Since the ingredients are not specified, there is no reason to believe that these products are chemically or toxicologically the same. There is further illustration of this problem in Table 3 with the two different types of insect repellants. Under such conditions it is not impossible that a relatively innocuous product from one source may be highly toxic when encountered from another supplier.

Brasso metal polish, while not a product officially endorsed by the military or found in normal supply channels, appears to represent at least an occupational hazard in the population observed. More inquiries were received about this commercial product than any other single item. It is, of course, widely used in the Army and is sold in almost all military retail sales outlets. In view of the foregoing, it is perhaps rather surprising that a high incidence of shoe polish ingestions was not concurrently observed.

Summary

An account of the organization and functions of the USAREUR Poison Control Center has been presented. Some of the problems inherent in serving a specialized type of population are discussed. It is hoped that this effort may someday be incorporated into an international program of poison control.

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EDITORIALS

Hepatitis

AN INCREASE in the number of cases of viral hepatitis in the United States in 1960 calls for some combined action by the physicians of the country, the press, and public health authorities.

From the 23,189 cases reported in 1959 the incidence of hepatitis rose to 41,013 in 1960. With the upward trend we probably will have well over 50,000 cases of the disease in 1961. However, Dr. Alexander Langmuir, chief epidemiologist of the U. S. Public Health Service, Atlanta, Ga., says that the authorities are divided on the predictions for 1961. Viral Hepatitis is reported both as infectious and serum types. In figures given out by the U. S. Public Health Service only the total of the two types is given. It would be difficult probably to do otherwise.

When a disease with such a high incidence comes to attention it is logical that the causes for its spread be thoroughly investigated. We do not need to go far for the answer in the case of serum hepatitis, but the matter of tracking down the spread in the infectious type of hepatitis is not simple. Water and food have been incriminated and should probably share the full load of blame. But no one is certain that these alone are responsible.

The laboratory does not adapt itself to animal experimentation with the virus of hepatitis. Consequently many of the questions that the medical profession and health authorities would like to have answered at this time are unanswerable.

Not all cases of jaundice are hepatitis. The physician must differentiate.

Dr. Carl J. Watson, Chairman of Medicine, University of Minnesota Medical School, an authority on liver disease, was interviewed on hepatitis. *Medical World News*, January 20, 1961, carries the interview. He states that the most useful tests are the urine bilirubin and urobilinogen, the cephalin flocculation, serum transaminase and thymol turbidity.

In the absence of specific therapy, bed rest and a good diet with considerable protein (80-100 gm a day) and 300 gm of carbohydrate are advised. Lemonade sweetened with 10% glucose is given freely. Fats in moderate amounts can be given in the form of olive oil, butter and salad dressing.

As the patient recovers the question is asked, "When can I get back to work?" Here is where the laboratory can assist greatly. Dr. Watson has outlined some requirements. For instance, bromsulfalein should be less than 10 percent and the serum transaminase less than 50 percent.

The physician always comes back to the question, "How can the disease be prevented?" There is no positive answer. Good hygiene, avoid contact with a patient suffering from the disease, and the use of gamma globulin for contacts are mentioned for the infectious type. But until we know the full picture everything is conjectural.

The Red Cross

OUR MINDS and our hearts turn to the Red Cross in March for it is that month that funds are solicited to enable this very worthy organization to do its work.

Clara Barton who organized the American Association of the Red Cross started her work in behalf of servicemen and their families almost one hundred years ago, during the Civil War. On July 3, 1861 she was given a military pass from the Secretary of War. The pass read—"Pass Miss Barton—Daily—over the Bridges and within the lines."

She worked tirelessly for the acceptance by the United States of the Geneva Treaty.

The charter issued to the American Red Cross was by an Act of Congress on June 6, 1900. Miss Barton became the first president of the American Red Cross, and served until 1904.

We know the story of the Red Cross activities in help of all types over the years. There is scarcely any person in the military services who has not been a beneficiary in some way of the services of that organization.

Let us help now for it is our turn.

SUPPORT YOUR RED CROSS—GIVE NOW

THE RED CROSS HELPS OTHERS. LET'S HELP IT.

"Our enduring aim is to build a nation and help build a world in which every human being shall be free to develop his capacities to the fullest."—*The President's Commission on National Goals*

The Association of Military Surgeons of the United States

Founded 1891, Incorporated by Act of Congress 1903

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Around the World

(Ser. IV, No. 3)

By

CLAUDIUS F. MAYER, M.D.

CANADA and Pugwash again witnessed another of the "Conference of Experts" which Cyrus Eaton, American millionaire and friend of the Soviet, used to call together annually. Last year's fifth conference discussed the potential possibilities and the menace of *biological warfare,* including the bacteriological and chemical weapon. A lengthy account of the discussions appeared in the bulletin of the U.S.S.R. Academy of Medical Sciences. Though the 26 participating scientists stated that they were not "experts" in bacteriological warfare, they represented all the ingredients which biological warfares are possibly composed of. The U.S. "delegation" included such names as Glass, Higgins, Kaplan, Lijk (or Leak?), Munch, Rabinovich, Rich, and Roseberry. From Russia, Dubinin, Imshenecky, Pavlichenko, and Smorodintsev were present. All invited members of the conference were microbiologists, or chemists, nuclear physicists, radiobiologists, biologists, economists and/or meteorologists.

The conference underscored that most of the experiments in the field of biological warfare are going on in absolute secrecy. Hence, accurate information as to their results is not available; yet, responsible military leaders are continuing to refer to effective chemical and/or microbiological weapons with great striking potential. Ahuzha, the Indian delegate, expressed his doubt that cholera vibrios could be effectively used for military purposes since the laboratory strains of this vibrio have small pathogenicity for human beings. New biological or antigenic variants of this agent would cause more damage, especially when introduced by way of respiration, instead of through the intestines.

The same Hindu expert stated that the *lethal dose of botulin* is 0.12 microgram for human beings. There are several varieties of this toxin. The most important are the toxins A, B, and E. Type C-beta is of questionable toxicity for man, C-alpha is not lethal, while the D toxin is inert for man. For a probable attack, the most toxic A-toxin would be used in the form of a concentrate of non-purified toxin, which would contain about 2×10^7 doses lethal to man, in one cubic centimeter of the concentrate. Thus, theoretically, five ounces could kill off the population of the entire planet. Of course, these figures are conditional, since many factors, including the proper weather, are necessary for the full effectiveness of such bacteriological military weapons. Thus, the proper size of the aerosol particles, which would successfully stick to the respiratory pathways, would have to be 2.5 to 5 microns, and the outside temperature of the air should not exceed 77 to 86°F.

The Conference discussed the potentialities of respiratory viruses (described by MAGNUS), the natural virus of smallpox (AHUZHA), enteric viruses (GARD), communicable encephalitis (SMORODINTSEV), rickettsiasis (STOKER), viruses of domestic animals (KAPLAN). Great potential danger for man is in the viruses of psittacosis, encephalitis, herpes B virus, street virus of rabies, of the rickettsiae of the Rocky Mountain fever and of tsutsugamushi. For animals, most danger would come from the viruses of foot-and-mouth disease, cattle plague, coccidiomycosis. The great devastating effect of viruses among animals is best shown by the example of the wholesale dying of Australian rabbits due to the virus of myxomatosis.

The Conference also discussed the *facilities for mass production,* the methods of delivery of the bacterial weapon, and the technic of employment of this weapon. We all know that any country, which knows how to

produce masses of antibiotics, of agricultural and food microbic products as well as vaccines, can switch its productive enterprises to the mass production of bacterial and viral agents suitable for biological warfare. These dangerous microbes can be produced even in a small country which is far behind the advancements of modern science and industry.

Russian delegates emphasized that the bacteriological weapon is *essentially for strategic purposes,* and not for tactical movements, especially when the weapon is used in an organized manner by a modern Army. It is only for diversion when bacteria are introduced locally, for instance, into the air-conditioning systems of large buildings, of government institutions, etc. Such attempts are only for weakening the attention toward the more serious danger of an organized use of the biological agents when they are spread over large districts of the enemy territory by airplanes, underwater vessels, rockets, etc.

A. LVOV, the Parisian microbiological geneticist, emphasized that many new variants of bacteria and *viruses can be artificially created* which are resistant to present therapeutic agents, and, with their modified antigenic structure, are also unapproachable to the possible antibodies acquired by ordinary immunization. The preparation of such new variants is easy; it can be done by transformation and by *"transduction"* which is the introduction of new nucleic acids into the microbic particles. It can be achieved also by means of adaptation of the viruses, for instance, developing them and breeding them under conditions of higher temperature. Bacteriologists can create *new serological types of polio and grippe viruses for war* purposes, which would have their maximum virulence at invasion through the respiratory ways. People would be more susceptible to such artificially created viruses than to the naturally occurring ones. Indeed, KAPLAN (U.S.A.) expressed the opinion that the 1957 epidemic of *Asiatic influenza* must have been the result of a new experimental variant of flu virus which escaped from a laboratory where it was obtained by genetic selection and recombination.

But even the combination and *simultaneous use of several bacterial agents,* e.g., of bacteria and viruses, will make the diagnosis difficult, and will cause a more malignant course of the resulting disease. The bacterial weapon may have a two-phase action. The initial hit will cause losses comparable to those after a small atomic bomb. But then, a wider epidemic will also result. Hence, bacterial agents of this kind would most likely be used at the deep rear area of the enemy. In the combat zone, bacteria are preferred which do not cause secondary cases by personal contact (such are epidemic encephalitis, botulin). The economy of a country would be most effectively undermined by the spread of cattle-plague.

Among the chemical agents, the Conference was mostly interested in the new type of *nerve gases* against which masks and protective clothing would be the only protection. Of course, such means are not easily available for large populations. In DUBININ's opinion, sarin and soman, when spread from an airplane in a 10-ton bomb, could cause a strike similar to an atomic bomb, over an area of 10 km². The use of the lyserginic-acid type of "hallucinatory" gases is less effective, and it is less suitable for mass employment. In general, attacks by gas and by bacteria are still generally of questionable efficiency, since much depends upon meteorological conditions and on other factors, and their intensity cannot be guaranteed.

Of course, everybody agrees with the recommendation of this "symposium" on biological warfare—that measures should be taken to prevent the production of these agents of mass attacks on humanity, and to make their use impossible. Since these weapons can be secretly produced anywhere in the world, the international control of their production would be extremely difficult. One step toward the elimination of biological warfare would be the ratification of the 1925 *Geneva Convention* by all countries, including the U.S.A., and Japan. The United Nations should create a Standing Scientific Commission for Biological and Chemical Weapons, and perhaps all members of the

International Society of Microbiologists should pledge themselves to cease working on any project promoting the knowledge in this field of biological warfare (*according to the account of Smorodintsev*).

Public *health in China* entered its 14th year of existence under the new regime. Its evaluation is made difficult due to the tendency of Red China to exaggeration in the statistics of its achievements. The Chinese Communists boasted, for instance, that China had already caught up with the United States in wheat production; but such a statement is completely ruined by the existence of famine in that country. With a close look at today's China, it is unquestionable that the new regime is trying to do much for the protection of the health of the workers, and for raising the level of the villagers in personal hygiene and sanitation of their environment.

Public health as a system was reorganized in China with the *creation of the Ministry of Public Health* in 1949, and of the accessory local organs in the provinces, districts, autonomous regions and counties. It is also unquestionable that the new health organization had to struggle with many *traditional problems of the old Chinese Empire*. There, the general mortality was higher than anywhere else in the world. According to official figures, at the start of the Chinese-Japanese War (1937-1945), the mortality of children in the rural districts reached 200 per 1000, in the cities 120 per 1000, and the maternal mortality was 130 per 1000. The newborn Chinese had a chance of 35 years to live an average life. Among each 1000 inhabitants, 500 got sick yearly, though at least 75% of the sickness and of death could have been avoided by the modern means of preventive medicine. Yet, these means were not within the reach of the average Chinese.

In the middle of this century, *China was struck by plague*, cholera, smallpox, and similar epidemics. In 1947, for instance, 30,000 cases of plague were recorded, and in 1946, 54,000 persons had smallpox, and 15,000 died from it, which is an irony of Fate since it was China where the first prophylactic vaccinations were invented against smallpox (long before Jenner). Moreover, in old China, hardly 9000 modern physicians were in practice, most of them in large towns. Hospitals were also in small number, available mostly in the cities. Actually, the health of the rural population was in the hand of quacks. To mobilize the sluggish consciousness of the Chinese in sanitary matters, the new public health authorities made a *mass patriotic national movement* from the usual propaganda for health education, although the new masters did not refrain from slandering the westerners by stating that some of the devastating diseases were imported by them into old China. They made, for instance, the accusation that "many lives were lost from cholera which was rampant in China for about 140 years due to English colonizers."

Plague, cholera, and smallpox are now said to have been practically eliminated from Red China. *The diseases which still are predominant* are schistosomosis, malaria, and leishmaniasis, although special campaigns were started against each of these evils. But, of course, China is very large, and the fight against snails, the carriers of the *Schistosoma*, extends over an area of 2 billion square kilometers. What can 17,000 persons, who represent the total staff of the schistosoma fight, do in such a huge theater of operations? In the pre-revolutionary China, *malaria* was also wide-spread, and in some provinces the sickness rate was as high as 80%. It happened in the province of Yunan that, in 1950, several towns were almost wiped out by malaria. Indeed, Yunan used to be so dangerous for health that Chinese folk songs jokingly advised: "If you travel to Manseba (a district in Yunan), first give away your wife; but if you take a trip to Gama (another district), first buy yourself a coffin." Now, the health-conscious Chinese made the destruction of mosquitoes the task of the entire population. The Chinese Academy of Science also maintains a new malariological research institute at the island of Heinan.

As to *leishmaniasis*, it can be said that certain segments of the population in China

are thoroughly infected with it (80%). For the treatment of such cases, about 20 special institutes were established, and they operate with very good results (96% success). In the northwestern parts of China, the disease resembles the Mediterranean type of kala-azar, while in the eastern portion of the country it is more like the cases seen in India. At the Northwest, it occurs mainly in young children and infants and in dogs, while in the East it is chiefly seen in older children and in adults. The sandflies, which are the vector of the Leishmania parasite, often feed on infected dogs, and transmit the dog's disease to his human playmates. The sandfly (*Phlebotomus*) also likes to feed on donkeys and cattle. The Chinese mass treatment is a three-day short course of two daily injections with sodium antimony gluconate; for the destruction of the sandfly DDT (1.5 gm. per m^2) proved to be the most effective.

China still has about 480,000 *physicians* who practice the *old type Chinese medicine.* Many of these men, some 200,000 of them, were attracted and added to the staffs of 80 combined hospitals, 50,000 policlinics, and over 10,000 sanitary posts at the agricultural fraternities (kolhozes). But some provision was also made to perpetuate the old Chinese medicine which has its own educational institutes, professors, policlinics (450) and special hospitals (144). Some of the local "hospitals" which were set up by agricultural cooperatives are staffed by local private practitioners, traditional Chinese physicians, and by demobilized (discharged) army medical workers. These "hospitals" are ordinary houses and public buildings converted to health purposes. *Peiping claims* to have now over 2,400 hospitals and clinics with a total of 21,000 beds; of these, only 61 were in existence before the advent of communists. About 29,000 doctors and nurses are now active in Peiping, and the mortality rate of the city fell to 6.6 per 1000 from 14.1 per 1000 inhabitants. The medical treatment is free to industrial workers and to students and government employees.

China attracts other communist countries with its special knowledge of cultivating and processing *medicinal plants,* and with its method of acupuncture treatment. Recently, representatives of the pharmaceutical industry arrived in China from as far as Hungary for the purpose of visiting the pharmaceutical laboratories of Peiping and Nanking, and for the study of the methods of Chinese materia medica. The Mongolians sent a team of doctors to study and practice the *Chinese acupuncture* in the Kiangsu Institute of Traditional Medicine. As a cultural exchange, the Russians sent a team of workers from the Irkutsk Blood Transfusion Station to help in the *establishment of blood banks* and in the organization of blood donations in Red China.

What do the Chinese invaders do in Tibet and for Tibetans? It is said that a joint medical training class had been set up in the *Loka area of Tibet* by a Chinese Army hospital, and by the Loka hospital. A 6-month primary course will *train medical personnel* to give treatment in ordinary cases of sickness, and to carry out work in public hygiene and preventive medicine. The Chinese source which brings this report remarks that nearly all students at the training class are former serfs, or the sons and daughters of serfs. Previously, no Tibetan doctors were available in the area of Loka, and many babies were born in cattle pens, and many mothers and infants died of infection.

Health conditions are certainly very *backward around the Himalayas.* In India, the government had made, for instance, a health survey of *Sikkim State,* which lies between Tibet in the North and Darjeeling District in the South. The number of people who are living here is about 150,000, but most of them are unaware of the causes of disease; they believe that ailments are caused by the demons or the gods. What kind of prevention could be taken then against them? The people do not clean themselves, and such nuisances as lousiness, scabies, and helminthiasis are widespread. Moreover, they are addicted to rakshi, an alcoholic fermented beverage prepared from millet or buckwheat; they also smoke tobacco; even some of the children drink and smoke. A small percentage (1.2%)

of the population indulges in opium. Although vital statistics are based just on guess, the crude birth rate is estimated at 28 per 1000, and the crude death rate at 15 per 1000. The rates of abortion (9.1%) and stillbirth (3.6%) are also high in Sikkim. There is a great need to improve health conditions.

It has been known for some time that about 4% of the *university students* are liable to *severe psychiatric disorders*, and about 15% more may have emotional or personal difficulties. This statement is based upon the findings of a former president of Yale, corroborated by statistics of mental ill-health among British students, and by the First International Conference on Student Mental Health in Princeton (1956). Now, further confirmation of the statement comes from a recent study carried out *among students of Cambridge (Engl.) University*, where the University Health Service has also mental and psychiatric facilities. The types of mental cases which the Service has to deal with are frank schizophrenia in approximately 7% of the students referred to the mental health facilities, schizoid beginnings in a further 6%, anxiety states in 40%, behavior disorders in 20%, severe sexual abnormalities (homosexual, sado-masochist, transvestist, fetishist) in 12%, long standing depression in 14%. Among the possible causes of such mental disorders are such factors as (a) diminution of personal responsibility at the university, (b) relaxation of control of discipline, and (c) unfamiliar methods of study. A university student usually misses the encouragement and the criticism of his schoolmasters. The Cambridge study emphasizes that some groups of students should be discouraged from seeking a university education. Certainly, any boy with a history of recent severe psychological illness should be discouraged from going to a university.

Not so long ago, the Bishop of Exeter preached a sermon at an Official Religious Service at Torquay, England. Many physicians attended. He spoke about the *moral issues in medicine*, which are actually not many. They embrace the question of surgical abortion, premarital chastity, the question of "should a doctor tell?", the problem of euthanasis, and the problem of gerontology. He thinks that surgical *killing of the fetus* in the womb is justified only when for some reason a Cesarean Section cannot be made, and delivery is impossible through the natural birth canals (e.g., with a hydrocephalic fetus). This is not accepted by other churches as a just indication for killing, however. In reference to premarital chastity, the bishop thinks that there is too negative an attitude in the official teachings of the Church, and little positive emphasis on the *virtues of chastity*, on the positive beauty of it, and on the loss of personal dignity and integrity which is involved in promiscuous sexual intercourse. Those psychiatrists who encourage extramarital adventures as a cure or prevention of repressions are wrong, because they raise more difficulties than they solve. There are too many doctors who try to *conceal the truth* from the patient, nevertheless telling the patient about his condition will remain a personal decision of the doctor. *Euthanasia* is just plain murder, yet it does not exclude the relieving of pain. Neither is it necessary to go out of the ordinary way in order to maintain the lives of very old persons whose faculties have failed, or are failing, and if the *retarding of death* confers little benefit or happiness upon the patient. In other words, as the bishop quotes the old couplet: "Thou shalt not kill, but needst not strive officiously to keep alive." The doctor is the heir to a Christian civilization. And thus it is his sacred duty and high privilege to heal diseases, to search for new discoveries, and to forge new weapons against the last enemy, Death. . . . *Multa paucis!*

The Sir Henry Wellcome Medal and Prize

COMPETITION FOR 1961

THE AWARD consists of a medal, a scroll, and a cash prize of $500 to be presented during the Annual Meeting of the Association of Military Surgeons of the United States, November 6, 7, and 8, 1961.

The competition is open to all medical department officers, former such officers, of the Army, Navy, Air Force, Public Health Service, Veterans Administration, The National Guard and the Reserves of the United States, and commissioned officers of foreign military medical services. No person shall be eligible for a second award and no paper previously published will be accepted.

Six copies of an essay (3,000-10,000 words) which reports some original work in the field of military medicine must be submitted to the Secretary of the Association and must bear a postmark no later than 15 June 1961. Manuscripts must be double spaced. The true name of the author must not appear on the manuscript. A *nom de plume* or symbol must be used. A sealed envelope bearing the *nom de plume* or symbol on the outside and an enclosed paper giving the true name and address of the author must accompany the essay.

Subjects may be in the theory and practice of medicine, dentistry, veterinary medicine, or sanitation. The winning essay becomes the property of the Association and will be published in MILITARY MEDICINE.

Federal Nursing Service Award–1961

THE AWARD consists of an honorarium of $500 and a scroll which will be presented during the Annual Meeting of the Association of Military Surgeons of the United States.

Any nurse in the Federal Nursing Services is eligible providing she submits an essay (3,000-10,000 words) which reports on the most beneficial study of or contribution to professional nursing in any area of practice. The subject material of the essay may be the result of the study or actual experience or a combination of both.

Essays must be submitted in six copies, double spaced, on standard size paper with the name of the author omitted, but a *nom de plume* substituted. An accompanying sealed envelope with the title of the essay and the *nom de plume* on the outside and a paper on the inside bearing the true name and address of the author must accompany the essay.

The manuscripts must be mailed to the Secretary of the Association and bear a postmark no later than 15 June 1961.

NOTES

Timely items of general interest are accepted for these columns. Deadline is 1st of month preceding month of issue.

Department of Defense

H & M SECRETARYSHIP ABOLISHED

The well publicized news that there would be a reorganization of the Department of Defense has now seen some action. The position of Assistant Secretary of Defense for Health and Medical Affairs has been abolished. Dr. Frank B. Berry who has held that position for a number of years handed in his resignation as of January 31. Military Medicine has thus suffered a reverse.

Medical affairs at the Department of Defense level will be handled now in the office of Assistant Secretary (Manpower, Personnel & Reserve).

One of the most important facets of any military operation is the medical aspect. While leaders must think of materiel and the individuals who handle it, they many times forget about the many problems that military personnel are subjected to in environments in which they are placed. The danger is that this phase of an operation is seldom considered until they run into trouble. And then "Let's call in the Medics." Better call in the Medics before; have them at hand; not buried under a cover of administrative procedures.

MEDICAL FITNESS STANDARDS

Revised medical fitness standards for new enlistees and inductees, applicable to all of the Armed Forces, was recently announced by the Department of Defense. This is the first major overhaul of medical fitness standards since World War II.

Primary responsibility for administering these standards has been delegated to the Army, as Executive Agent of the network of 70 Armed Forces Examining Stations.

Army Regulations 40-501, "Standards of Medical Fitness," covers all the changes.

Army

Surgeon General—LT. GEN. LEONARD D. HEATON

Deputy Surg. Gen.—MAJ. GEN. THOMAS J. HARTFORD

50TH ANNIVERSARY OF DENTAL CORPS

Prevention is the slogan for the future as the Army Dental Corps celebrates its Golden Anniversary. "The loss of man-hours due to dental causes constitutes a significant military problem," says Major General Joseph L. Bernier, Assistant Surgeon General for Dental Activities. "Men away from duty, even for a short time, may seriously interfere with operations and training in our present mechanized and specialized Army."

During the Civil War men were discharged when they no longer had front teeth. Soldiers then tore the cartridge for their muzzle loaders with their teeth.

Over the years there has been a change in attitude regarding dental defects and military service. From a non-utilization policy because of dental defects an attitude has developed in which those with dental defects are accepted. These defects are corrected where possible. This policy has meant much toward conserving the manpower in the military services. Needless to say dental officers of the military services are busy men.

The Army Dental Corps was established by Congress on 3 March 1911. Naturally there has been change in equipment and treatment following the general trend in medicine. Increased knowledge of diseases of

the mouth has led to specialization as in other fields. Dental equipment for field use particularly has had a major overhaul. Now with four dental chests a dental officer can do anything in the field that he would be called upon to do in his private office. And assisting him are trained assistants, many of whom have received their training in the military service. The Brooke Army Medical Center, Fort Sam Houston, Texas, has a school established for this purpose.

Postgraduate training and research are carried on at the Walter Reed Army Medical Center. A course in Preventive Dentistry will be given this spring.

Prevention will be stressed. As General Bernier says, "It is apparent that the greatest initial effort in education must be expended in reorienting dental officers to their importance as chairside teachers and supervisors of oral hygiene for their patients. In essence, every operative, restorative and periodontal treatment is prevention."

ADVISORY COUNCIL

The Surgeon General of the Army recently met with his Advisory Council to confer with the members on health problems affecting the nation's medical and dental professions. In the event of mobilization this group would be called to active duty and assume leadership roles within the Army Medical Service requirements.

U. S. Army Photo

Seated *(L to R)* MAJ. GEN. T. J. HARTFORD, MC, Deputy Surgeon General; LT. GEN. LEONARD D. HEATON, The Surgeon General; BRIG. GEN. A. M. MARBLE.
Standing *(L to R)* BRIGADIER GENERALS J. H. KIDDER, J. M. BOSWORTH, F. E. WILSON, T. P. FOX, D. E. MAYER, T. G. BLOCKER, JR., J. B. LAGEN, H. G. SCHEIE, and C. S. JUNKERMANN.

The present Chief of the Advisory Council is Dr. Alexander M. Marble, Professor of Clinical Medicine, Harvard University School of Medicine, Boston. The membership includes Dr. Truman G. Blocker, Jr., Professor of Plastic Surgery, University of Texas School of Medicine, Galveston; Dr. Joseph M. Bosworth, Division Medical Director for Southern Division, Liberty Mutual Insurance Company, Atlanta; Dr. Thomas P. Fox, Chairman of the Department of Defense Dental Advisory Committee, and President of the Pierre-Fauchard Academy of Philadelphia; Dr. Carl S. Junkermann, Clinical Instructor of Medicine, Ohio State University, Columbus; Dr. James H. Kidder, Special Assistant to The Surgeon General on Reserve Affairs, Washington; Dr. John B. Lagen, Associate Professor of Medicine, School of Medicine, University of California, San Francisco; Dr. David E. Mayer, Associate Professor of Plastic Surgery, New York Medical College, New York City; Dr. Harold G. Scheie, Professor of Ophthalmology, University of Pennsylvania School of Medicine, Philadelphia; and Dr. Frank E. Wilson, Executive Vice-President and Secretary, Joint Blood Council, Washington, D.C. All of these doctors hold Army Reserve Commissions in the grade of Brigadier General.

EXECUTIVE OFFICER SGO

Colonel Laurence A. Potter, MC, has been named Executive Officer of the Surgeon General's Office. He will also head the Directorate, Administration and Supportive Service. He replaces Colonel John H. Voegtly who has been assigned as Medical Attache in the United States Embassy, London.

Colonel Potter received his medical degree from the University of California, and entered the Army Medical Corps in 1939. He is a graduate of the Army War College and

received a Master's degree in Public Health from Harvard University.

During World War II, he was Surgeon of the 7th Division and later Surgeon of the XXIV Corps in the Asiatic-Pacific Theater. In 1945-1946 he was Surgeon of the U.S. Forces in Korea. His broad military experience makes him well qualified for the position to which he has been assigned.

ASSIGNMENTS TO SGO

Recent assignments to the Office of the Surgeon General are:

Major Samuel A. Babcock, MSC—Physical Standards Division;

Captain Jack E. Staples, MSC—Directorate of Plans, Supply and Operations.

MFSS AGAIN

The Army Medical Service School at Brooke Army Medical Center, Fort Sam Houston, Texas, will again be known as the *Medical Field Service School,* the title it held during the first 35 years of its existence.

Internationally known as one of the finest military-medical institutions in the world, the school was located at Carlisle Barracks, Pa., from 1920 until 1946, when it was moved to Brooke Army Medical Center, where it functions as a Class II activity under the jurisdiction of the Army Surgeon General's Office.

FORT BENNING MEDICAL SERVICE

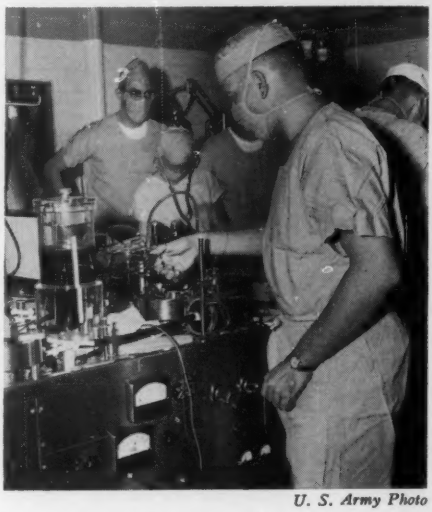
Fort Benning, Georgia, is the U. S. Army Infantry Center. Like all large military establishments it has a very busy medical service. In three months the Central Appointment Desk at the Martin Army Hospital handled 17,523 appointments. But that figure does not tell the complete story of the number of patients treated at Fort Benning since there are other medical facilities at the station.

During the same three months there were 116,200 patients that were treated at Fort Benning. This is a medical service of some magnitude. Heading the service is Colonel Bryan C. T. Fenton, Medical Corps, who has plenty of experience to his credit to handle the situation.

The story at Fort Benning is the same at many other military posts. It all adds up to making the medical services of the Armed Forces very busy people.

HEART SURGERY

Not too long ago any surgery on the heart would have been considered a rash procedure. Today heart surgery has become a highly developed specialty. The operating room in which such surgery is performed is filled with complex equipment which is thrown into action by the highly trained teams to accomplish a delicate task.



U. S. Army Photo

CAPT. DAVID S. ENGQUIST, MSC, USA, operates the Mayo-Gibbon Pump Oxygenator during open heart surgery at Walter Reed Hospital.

Brigadier General C. S. Lyter, Commanding the Walter Reed General Hospital, Washington, is an accomplished surgeon and head of the cardiac surgery team at that hospital.

We show here some of the complicated apparatus required to do such surgery.

EVANGELINE G. BOVARD AWARD

The fourth Evangeline G. Bovard award was presented to Major Hendrina Jankowski, ANC, Head Nurse, Ward L-1, Officer's

U. S. Army Photo

MAJ. HENDRINA JANKOWSKI, ANC

Medical Ward, Letterman General Hospital, on January 16.

This award made annually to an outstanding nurse at Letterman General Hospital was presented by its founder, Colonel Robert Skelton, MC, USA, Retired, who resides in San Francisco. He established the award for his wife, Evangeline G. Bovard, an Army nurse, who died at Letterman Hospital, December 29, 1955. A trust fund of $25,000 has been established for the award.

RETIRED

Colonel Warner F. Bowers, Medical Corps, Chief of the Department of Surgery, Tripler General Hospital, has accepted the position of Associate Executive Director of the International College of Surgeons. He will also be Director of Educational Activities. His new address is: 1516 Lake Shore Drive, Chicago 10, Ill.

Navy

Surgeon General—REAR ADM. EDWARD C. KENNEY

PORTRAIT

A portrait of Rear Admiral Bartholomew W. Hogan, recent Surgeon General of the Navy, has been presented to the Edward Rhodes Stitt Medical Library at the National Naval Medical Center, Bethesda, Maryland.

CO—NAVAL DENTAL SCHOOL

Captain Arthur R. Frechette, DC, USN, became the 16th Commanding Officer of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, upon the assignment of Rear Admiral Eric G. F. Pollard, DC, USN, former Commanding Officer, to Norfolk, Virginia.

Admiral Pollard has become the Director of Dental Activities, Fifth Naval District with additional duty as Commanding Officer, U. S. Naval Dental Clinic, Norfolk.

"IN MEMORIAM" PLAQUE

Major General Melvin J. Maas, USMC, Retired, Chairman of the President's Committee on Employment of the Physically Handicapped, presented to the Medical Department of the Navy recently an "In Memoriam" plaque honoring the late Vice Admiral Ross T. McIntire, Medical Corps, U. S. Navy. Retired as a "volunteer extraordinary and ambassador plenipotentiary for the handicapped of all Nations."

Rear Admiral Frank P. Kreuz, Medical Corps, USN, accepted the plaque at the National Naval Medical Center, Bethesda, of which he is the Commanding Officer.

Official U. S. Navy Photo

(L to R) CAPT. ROBERT B. BROWN, MC, USN, Commanding Officer, U. S. Naval Hospital, National Naval Medical Center, Bethesda; MAJ. GEN. MELVIN J. MAAS, USMCR, Ret.; REAR ADM. FRANK P. KREUZ, MC, USN.

ASSIGNMENT

Lieutenant John L. Karrer, MSC, USN, has been assigned to the Bureau of Medicine and Surgery for duty as Head, Medical Records Information Branch, Physical Qualifications and Medical Records Division.

LEAGUE OF NURSING PROGRAM

Navy nurses will participate in the National League for Nursing Convention to be held in Cleveland, Ohio, April 10-13, 1961.

On the program are Captain Ruth A. Houghton, Director of the Nursing Division, Bureau of Medicine and Surgery, Captain Erickson, Commanders Blaska, and Grimes; Lieutenant Commanders Conrad, Upchurch, Gearing, VanGorp; and Lieutenant McIntyre. Retirement point credits will be granted for attendance.

THE 21,000TH BABY

The U.S. Naval Hospital, Jacksonville, Florida, celebrated the birth of the 21,000th baby born at the hospital since the family wing opened in 1943. Vickie Lynn Bernath, daughter of Robert and Emily Bernath was born on January 11, 1961. Airman Bernath is stationed at the Naval Air Reserve Training Unit, Jacksonville.

Air Force

Surgeon General—MAJ. GEN. OLIVER K. NIESS

Deputy Surg. Gen.—MAJ. GEN. JOHN K. CULLEN

NEW COMMANDER AEROSPACE MEDICAL CENTER

Brigadier General Theodore C. Bedwell, Jr., U. S. Air Force, Medical Corps, succeeded Major General Otis O. Benson, Jr., as Commander of the USAF Aerospace Medical Center, Brooks Air Force Base, Texas, February 1.

General Bedwell's last assignment was Chief Surgeon of the Strategic Air Command. In his new duty, he heads up Air Training Command's Aerospace Medical Center, which consists of the Air Force School of Aviation Medicine at Brooks, the USAF Hospital and Epidemiological Flight Laboratory at Lackland Air Force Base, and the Medical Services at Gunter Air Force Base, Ala.

RADIO IN TEETH

This is hard to believe but it has happened. Colonel Allen A. Brewer, head of the Dental Sciences Division's Prosthodontics Section at the Air Force School of Aviation Medicine, Brooks Air Force Base, Texas, has developed a process whereby a miniature radio transmitter can be built into complete dentures. Any tooth contact or combination of tooth contacts send a recordable signal. The signal is picked by a receiver, amplified, and recorded on a pocket sized recorder.

He has shown that daytime non-masticating contacts may run as high as 1500 per hour. Contacts while eating vary from 700 to 2700 per hour.

Doctor Brewer is continuing his testing. By using differently constructed dentures in the same man's mouth, he has been able to tell what effects the arrangement of the teeth have on the number of contacts made during eating, sleeping, and grinding of the teeth to determine which is the most ideal occlusion for the patient.

Public Health Service

Surgeon General—LUTHER L. TERRY, M.D.

Deputy Surg. Gen.—JOHN D. PORTERFIELD, M.D.

POLIO

Forty percent of the population, according to the latest Public Health Service estimates, have not been vaccinated against poliomyelitis. Only 25 percent have had the recommended full course of three shots, plus a booster.

There is a need for an intensification of the program to vaccinate. The Salk vaccine is available and this is the time to use it, not delaying until the disease becomes rampant in the summer months.

One of the big problems is how to reach

the lower socio-economic groups for in this area lies the mass of unvaccinated. And it is in this group that the higher percent of polio occurs.

It is very doubtful that the oral polio vaccine will be in production this year. Only the Sabin type has been approved.

Everyone should get behind the vaccination program.

EPIDEMIOLOGY COURSE

A course in *Applied Epidemiology* will be offered at the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, April 10-14, 1961.

This course is designed primarily for physicians who serve as investigators of disease outbreaks or have administrative responsibility for such investigations.

Further information may be obtained from: Chief, Communicable Disease Center, Atlanta 22, Georgia, Attention: Chief, Training Branch.

HOSPITAL UTILIZATION

A booklet, *Hospital Utilization* in the last year of life (PHS Publ. No. 584-D3) is available from the U.S. Government Printing Office, Washington 25, D.C., for 30¢ a copy.

This report will be valuable to those who are studying the old age problem.

BIBLIOGRAPHY AVAILABLE

The National Library of Medicine has just issued a bibliography on *Physiologic Involution in Normal Aging Man.* For free copy address the Acquisition Section of the Library, Washington 25, D.C.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.

Deputy Chief Med. Dir.—H. MARTIN ENGLE, M.D.

APPOINTMENT

Dr. James H. Matthews, has been appointed chief of the Veterans Administration's clinical research in pulmonary diseases and will coordinate the large-scale VA-Armed Forces cooperative studies in that field. He has been assigned to the Central Office in Washington.

STATISTICS

Here are some statistics pertaining to the medical activities of the Veterans Administration. Figures in parentheses are those for 1959. Those figures not in parentheses are the estimated figures for December 1960.

Veterans	
in civil life	22,478,000 (22,599,000)
WWI	2,619,000 (2,724,000)
Ave. daily patient load	
in hospitals	112,830 (112,174)
Ave. daily member load	
in domiciliaries	16,995 (17,018)
Visitors for med. care	
(months)	198,600 (192,066)

SPANISH AMERICAN WAR VETERANS

A reminder to any of the remaining Spanish-American War veterans who desire outpatient care from private physicians at the expense of the Veterans Administration was issued recently. Such veterans must notify the nearest VA office immediately. Only by doing so can the treatment be authorized.

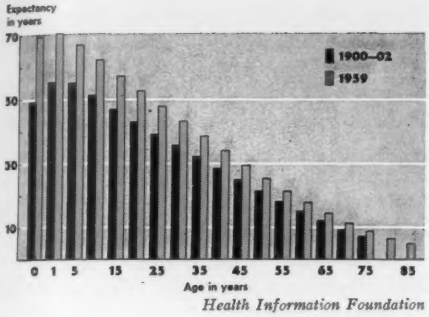
The Veterans Administration said that there were 34,000 living Spanish-American War veterans as of November 30, 1960.

Miscellaneous

LIFE EXPECTANCY—USA

As has been pointed out many times the life expectancy in the United States has increased. A child born at the turn of this century could expect to live to about the age of 50; now a child born has twenty years added to his life expectancy. At all ages as the graph below shows our life expectancy has increased.

There are many factors that are responsible for this increase of life in the USA. The knowledge gained through research in disease, drugs and sanitation has been responsible. However, without the application of this



Health Information Foundation

knowledge we in the United States would still be at the 50-year life expectancy stage.

VIG

Millions of lives have been saved by vaccination against smallpox.

But there are rare instances in which a strange reaction from smallpox vaccination endangers sight and occasionally life.

Recently, a blood fraction called VIG was prepared to fight these rare complications. Red Cross is the only source in this country for VIG. And limited quantities are available at Red Cross regional blood centers—for use by doctors.

EDUCATION

The Department of Labor projections for the next ten years are to the effect that 30 percent of the 26 million new workers who will join the labor force will fail to complete high school, and that 2.5 million of them will not finish grade school.

Senator Ralph Yarborough of Texas sees a great need for a Cold War Veterans GI Education Bill for those who meet their draft requirements and then are put back into the labor force of the country.

POSTGRADUATE COURSES

Postgraduate Courses available through the American College of Physicians are:

Problems of Growth and Aging, Lankenau Hospital, Philadelphia, April 11-14;

Gastroenterology, Univ. of Pennsylvania Graduate School of Medicine, Philadelphia, May 15-19;

Current Aspects of Internal Medicine, State University of Iowa College of Medicine, Iowa City, June 19-23.

CARDIOVASCULAR AGENTS HANDBOOK

The National Academy of Sciences-National Research Council has published the first volume of a three-volume *Index-Handbook of Cardiovascular Agents.*

Pertinent information drawn from 13,427 scientific papers, monographs, and reviews is contained in the publication, each entry distilled to one or more lines of essential content and indexed according to chemical and biomedical terms.

This volume is number 2. Volumes 1 and 3 are to appear within the next two years. Volume 2 is published in two parts at $15 for the set. It may be ordered from the Printing and Publishing Office, NAC-NRC, 2101 Constitution Ave., N.W., Washington 25, D.C.

HEART ASSOCIATION BOOKLET

Epidemiology of Cardiovascular Diseases Methodology, the report of a conference sponsored by the American Heart Association and the National Heart Institute in April 1959, and published as a supplement to the October 1960 issue of the *American Journal of Public Health and the Nation's Health* is available from the American Heart Association at $1.00 a copy. Address is: 44 East 23rd St., New York 10, N.Y.

BOOKLET

Your Children and Their Gangs, a 34-page booklet, is a new publication of the Children's Bureau, Department of Health, Education, and Welfare.

Here is a good reliable piece of literature that every parent should read. The publication is No. 384-1960 and can be ordered from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., for 20¢ a copy.

MEETINGS

The 42nd Annual Session of the American College of Physicians will be held at the Americana Hotel, Miami Beach, Florida,

May 8-12, 1961. Executive offices of the college are at 4200 Pine St., Philadelphia 4, Pa.

The Society of Nuclear Medicine will hold its 8th Annual Meeting at the Penn Sheraton Hotel, Pittsburgh, June 14-17, 1961. For further information address all inquiries to the Administrator, Society of Nuclear Medicine, 430 N. Michigan Ave., Chicago 11, Ill.

The American Physical Therapy Association will hold its 38th Annual Conference at the Palmer House, Chicago, Ill., July 2-7, 1961. The theme of the Conference will be "Aftercare Programs." Headquarters of the Association are at 1790 Broadway, New York 19, N.Y.

The 4th International Conference on Medical Electronics combined with the 14th Annual Conference on Electrical Techniques in Medicine and Biology will be held at the Waldorf-Astoria, New York City, July 16-21, 1961. For further information address Institute of Radio Engineers, 1 East 79th St., New York.

The American Association of Medical Record Librarians will hold its 1961 Annual Meeting at the Benjamin Franklin Hotel, Philadelphia, October 9-12.

The American Public Health Association Meeting will be held November 13-17 at the Convention-Exhibit Building, Detroit, Michigan.

WHO PUBLICATIONS

Oral Immuniz. Against Polio; Yaws; Leprosy; Griseofulvin in Mass Treat. of Tinea Capitis. Bull. Vol. 23/6/60. $2.00.

Expert Comm. on Venereal Dis. & Treponematoses. TR. No. 190/60. $1.00.

European Tech. Conf. on Control of Infectious Diseases through Vacc. TR. No. 198/60. $.30.

Requirements for Biolog. Substances. TR. No. 200/60. $.30.

Bilharziasis. TR. No. 204/60. $.30.

Med. Supervision in Rad. Work. TR. No. 196/60. $.30.

Cholera, Malaria, Tbs. Chron. Vol. 15/1/61. $.30.

Address orders to: Columbia University Press, IDS, 2960 Broadway, New York 27, N.Y.

U. S. GOVERNMENT PUBLICATIONS

Handbook of the Hospital Corps. Navy, Cat. No. D 206.6/3:H79. $10.00.

Aseptic Nursing Techniques. Cat. No. FS 2.60/2:N93. $1.00.

Arctic Bibliography, Vol. 9. Cat. No. D 1.2:9. $5.50.

Film Reference Guide for Med. & Allied Sciences. $1.00.

Autopsy Manual. Cat. No. D 101.11:8-300. $.50.

Mental Health Motion Pictures. Cat. No. FS 2.22/15:M 85/960. $.35.

Strike Back at Strokes. Cat. No. FS 2.6: ST 8. $.40.

Dietary Aspects of Cardiovascular Diseases. Cat. No. FS 2.24:C 17/960. $.35.

Tranquilizing and Anti-depressant Drugs. Cat. No. VA 1.23/2:6. $.15.

Bibliography of Space Medicine. Cat. No. FS 2.21:21. $.35.

Next Ten Years in Space. Cat. No. 86-1:H doc 115. $.60.

Any of above may be ordered from the Sup't. of Documents, Govt. Printing Off., Washington 25, D.C. (Cash or Money Order.)

DEP'T. OF COMMERCE PUBLICATIONS

Eleven Thousand Persons Over 90 Years of Age (60-31717). Trans. from Russian; 5 pages, 50¢.

Comparative Study of Portal Circulation Time in Patients With Portal Hypertension (60-31790). Trans. from Russian; 6 pages, 50¢.

Medicines Built Into Molecules (60-11896). Trans. from Russian; 10 pages 50¢.

On The Therapeutic Use of Vitamin B12 In Atherosclerosis (60-41197). Trans. from Russian; 7 pages, 50¢.

Communist China's Achievements in Hematology in the Past Decade (60-31129). Trans. from Chinese. 6 pages, 50¢.

Military Medical Journal (60-11822). Trans. from Russian; 227 pages, $3.50.

On Certain New Factors of Blood Coagulation in Patients With Impaired Coronary Circulation (60-41201). Trans. from Russian. 4 pages, 50¢.

All-Union Conference of Surgeons (60-31788). Trans. from Russian. 26 pages, 75¢.

Conference on the Problem of Acute Radiation Sickness (60-51526). Trans. from Russian. 11 pages, 50¢.

Applied Health Physics Annual Report for 1958 (ORNL-2777). 57 pages, $1.50.

Above can be obtained from the Office of Technical Services, B & D Svcs., Department of Commerce, Washington 25, D.C.

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Colonel Frank O. Alexander, MC, USA
Major Stephen Akers
Col. James Q. Simmons, Jr., MC
Miss Ruth Addams
Col. Robert L. Cavenaugh, MC, USA
Col. Nolton E. Fowler, USAF, DC
Capt. Flora M. MacDonald, ANC, USAR

New Members

Colonel Louis S. Leland, MC, USA
Capt. James F. Hoffman, Jr., MC, USAF
Capt. Jerry Robert Beachum, DC, USA
1/Lt. Joseph Cassius, MSC, USAR
Lt. Col. Genevieve J. Thompson, NC, USAF
Capt. Noel H. Kleppel, USAF, MC
1/Lt. Dale Everett Hoyt, CAP
Colonel James B. Ridley, MC, USAR
Lt. Col. Stephen D. Berardinelli, MC, USA
Major Vincent V. Madonia, MC, USAR
1/Lt. Robert S. Homes, MC, USA
Edward A. Kantor, M.D.
Capt. Donald B. Kinsler, USAF, MC
Capt. George E. Shambaugh, III, MC, USA
1/Lt. Charles E. Snavely, MSC, USA
Col. Charles E. Tegtmeyer, MC, USA
Lt. Ruby E. Walker, NC, USN
Gen. Dr. Ernestino De Liveira
Capt. Raymond F. DeCresente, DC, USA
Major Henry S. Haerle, MC, USAF
Cecilia H. Hauge, R.N., Vet. Adm.
Jean F. Richards, R.N.
Capt. Robert W. Selle, MC, USA
Col. Charles E. Foley, DC, USAR
Col. Oliver J. Harris, MC, USAR
Col. Leo A. Lieberman, MC, USAR
Col. M. Stephen Schwartz, MC, USAR
Col. George A. Sotirion, MC, USAR
Col. Sydney W. Stringer, MC, USAR
Colonel Barnet Halperin, MC, USAR
Dr. Mortimer Hacker
Lt. Col. Frank J. Gasper, DC, USAR
Capt. David F. Hottenstein, MC, USN
Major Regina A. Novotny, ANC
Richard Jaceson Turner, M.D.
Capt. Richard N. Bolton, MC, USA
Lt. Col. Joseph Thomas Roberts, MC, USAR
Col. Richard W. Satterwaite, MC, USA, Ret.
Major Gertrude C. Seibert, ANC, USA
1/Lt. Gene Ackerman, MSC, USAR
Capt. Koert Hawley Jackson, MC, USAF
Robert M. Stauffer, R.N.
Major Luke Rader, MC, USAR
Major Bernice Bondreau, ANC, USA
LCDR Gerald W. Cady, MC, USN
Major Susanna L. Chase, ANC, USAR
Capt. Marion K. Mellott, ANC, USAR
Major Alejandro Valencia C., MC, Mexican Army
1/Lt. Theodore H. Kittell, USAF, MSC
Captain John Lukasik, MC, USA
Dr. Albert Siegel
Chief Pharm. Alfred A. Reinhardt, VA
Capt. Francis J. Loperfido, MC, AUS
Capt. Margaret Graham, AMSC, USAR
Asst. Pharm. Thomas B. Poux, USPHS
Sr. Pharm. Lowell R. Pfau, USPHS
Lt. Col. George R. Steinkamp, MC, USAR
Capt. Paul Stephen Russell, MC, USAR
Lt. Joseph C. Bamford, Jr., MC, USNR
Capt. Albert Leslie Gibbons, MC, USNR
Lt. V. D. Mattia, MC, USN, Korea
Capt. J. Campbell, MC, USAF

Capt. Alfred Pletscher, MC, Swiss Army
Capt. Marvin L. Kidd, MSC, USA
Lt. jg Mae Kobishop, USNR
Major Dorothy Parsons, ANC, Ret.
Capt. Francisco Canales-Roman, DC, USA
Capt. Robert E. Carson, DC, USA
Capt. James E. Curran, DC, USA
Capt. Eugene Gore, DC, USA
Capt. Frederick C. Hamer, Jr., DC, USA
Capt. Oscar Lemer, DC, USA
Capt. Alfred P. Mavilio, DC, USAR
Major Margaret Joanne Whitton, ANC, USA
Capt. Howard A. Gerstein, DC, USA
Dr. Howard Grossman, VA
Capt. Allan H. Orange, DC, USA
Morris Perry, M.D.
Lt. Winifred L. Copeland, NC, USNR
Col. Herbert D. Edger, MC, USA
Mr. Preston Holden
Lt. Col. J. Raymond Gladue, MC, NG
1/Lt. Richard E. Deitrick, USAFR, MC
Capt. Harold W. Andersen, MC, NY, NG
Lt. Col. Margaret McGowan, ANC, USAR
Lt. jg. Ann V. Shenkus, NC, USNR R

MEMBERSHIP COMMITTEE

Commander Calvin F. Johnson, MSC, U. S. Navy, Chairman
Mr. George F. Archambault, U. S. Public Health Service
Commander Burdette M. Blaska, NC, U. S. Navy
Lt. Col. Jesse W. Brumfield, MSC, U. S. Army
Lt. Col. Nathan Cooper, U. S. Air Force, (MSC)
Mr. Vernon O. Trygstad, Veterans Administration

Deaths

MONCREIF, William H., Medical Corps, U. S. Army, Retired, died on January 25 at Fitzsimons General Hospital, Denver. His age was 84.

Colonel Moncreif was a native of Greensboro, Georgia. He received his medical degree from Emory University (Southern Medical College) Georgia in 1897. In 1898 he was appointed a regimental surgeon for the 2nd Georgia Volunteers and served with them through the Spanish-American War. In 1902 he was commissioned in the Army Medical Corps and was retired on August 31, 1939.

During World War I he commanded the largest hospital of its kind in military history—the 25,000 bed Mesves Hospital in France. He was in command of Walter Reed General Hospital from 1932-1936.

After his retirement from military service he became Superintendent of the South Carolina Tuberculosis Sanitorium, State Park, S.C., a position he held until 1954.

He is survived by his widow, of 1644 Kathwood Drive, Columbia, S.C., and two sons, Colonel William H. Moncrief, Jr., Womack Army Hospital, Fort Bragg, N.C.; and Lt. Colonel John A. Moncreif, Office of the Army Surgeon General, Washington, D.C. Interment was at Arlington National Cemetery.

SCHWARTZ, Walter H., Captain, Medical Corps, U. S. Navy, Retired, died at Mt. Carmel Hospital, Columbus, Ohio, January 13. He was 54.

Doctor Schwartz was a native of Burlington, Iowa. He received his medical degree from the University of Iowa in 1930 and was commissioned in the Medical Corps of the Navy. For two years during World War II he served as Senior Medical Officer on the USS *Pensacola*. He was Commanding Officer of the U. S. Naval Hospital, Yokuoka, Japan from April 1955 to April 1957, and then became Commanding Officer of the U. S. Naval Hospital, Portsmouth until his retirement on December 1, 1959.

He is survived by his widow, of 37 Oakhill Ave., Delaware, Ohio.

NEW BOOKS

Books May Be Ordered Through The Association

The Physiological Basis of Medical Practice. A Text in Applied Physiology. 7th edition. By Charles Herbert Best, C.B.E., M.A., M.D., D.Sc. (Lond.), F.R.C.S., F.R.C.P. (Canada), and Norman Burke Taylor, V.D., M.D., F.R.S. (Canada), F.R.C.S. (Edin.), F.R.C.P. (Canada), M.R.C.S. (Eng.), L.R.C.P. (Lond.), with twenty-eight contributors. The Williams & Wilkins Company, Baltimore. Price $16.00.

An Introduction To Functional Histology. 2nd edition. By Geoffrey H. Bourne, M.Sc., D.Sc., D.Phil. Little, Brown and Company, Boston. Price $8.50.

Recent Advances in Pathology. 7th edition. Edited by C. V. Harrison, M.D. Little, Brown and Company. Price $11.00.

Recent Advances in Biochemistry. 4th edition. By T. W. Goodwin, D.Sc., F.R.I.C. Little, Brown and Company, Boston. Price $11.50.

Clinical Disorders of The Pulmonary Circulation. Edited by Raymond Daley, M.A., M.D. (Camb.), F.R.C.P., and John F. Goodwin, M.D. (Lond.), F.R.C.P., and Robert S. Steiner, M.D.N.U.I., M.R.C.P., D.M.R., F.F.R. Little, Brown and Company, Boston. Price $14.00.

The American Academy of Orthopaedic Surgeons. Instructional Course Lectures. Volume 17. Edited by Fred C. Reynolds, M D. The C. V. Mosby Company, St. Louis. Price $18.50.

New and Nonofficial Drugs—1961. An Annual Compilation. J. B. Lippincott Company, Philadelphia and Montreal. Price $4.00.

The Urological Aspects of Bilharziasis in Rhodesia. By R. M. Honey, M.D., F.R.C.S. (Edin.), and M. Gelfand, C.B.E., M.D., F.R.C.P., with a Foreword by D. M. Blair, O.B.E., M.D., D.P.H. The Williams & Wilkins Company, Baltimore, exclusive U.S. agents. Price $2.50.

Radioisotope Laboratory Techniques. 2nd edition. By R. A. Faires and B. H. Parks., with a foreword by Dr. Henry Seligman. Pitman Publishing Corporation, New York, Toronto, London. Price $5.75.

Clinical Toxicology. By C. J. Polson, M.D. (Birm.), F.R.C.P., M.R.C.S., and R. N. Tattersall, O.B.E., M.D. (Lond.), F.R.C.P. J. B. Lippincott Company, Philadelphia. Price $10.00.

Surgical Diseases of The Chest. Edited by Brian Blades, M.D.; eighteen contributors. The C. V. Mosby Company, St. Louis. Price $22.00.

Abandoned. The Story of the Greely Arctic Expedition, 1881-1884. By A. L. Todd. Introduction by Vilhjalmur Stefansson. McGraw-Hill Book Co., Inc., New York, Toronto, London. Price $5.95.

Hospitals, Clinics, and Health Centers. By editors of *Architectural Record.* F. W. Dodge Corp., 119 W. 40th St., New York 18. Price $9.75.

Planning the Surgical Suite. By Warwick Smith. F. W. Dodge Corp., New York. Price $12.75.

Congenital Malformations of the Heart. Vol. I, General Considerations. 2nd Ed. By Helen B. Taussig. Harvard University Press, Cambridge. Price $4.75.

Respiration. Physiologic Principles and Their Clinical Applications. By P. H. Rossier, A. A. Buhlmann, and K. Wiesinger. Edited and translated from the German Edition by Peter C. Luchsinger, M.D., and Kenneth M. Moser, M.D. The C. V. Mosby Company, St. Louis. Price $15.75.

BOOK REVIEWS

CLINICAL ORTHOPAEDICS. No. 17. Clinical Physiology and Pathology of Bone. 387 pp., illust. J. B. Lippincott Company, Philadelphia and Montreal. Price $7.50.

This volume is replete with thirty articles on Clinical Physiology and Pathology of Bone. They have been collected to honor Franklin C. McLean, M.D., Ph.D. Of these thirty articles there are only a few which are truly clinical in immediate scope, but their presence in this volume is unquestioned. To glean clinically-oriented data requires a wealth of background material, and this collection of papers does help to fill out the background. Of particular interest to the clinical orthopedist were the papers of Talmage et al. and of Nordin. Talmage, Wimer, and Toft presented "Additional Evidence in Support of McLean's Feedback Mechanism of Parathyroid Action on Bone." Here the relations between body fluids and bone with respect to calcium and phosphorus and the feedback mechanism of the parathyroids is presented. The paper of Nordin on "Osteomalacia, Osteoporosis and Calcium Deficiency" brings the deviations from the views of Albright and Reifenstein into a clearer focus, emphasizing the role of calcium deficiency rather than a protein deficiency as the basic defect in the production of so-called post-menopausal and senile osteoporosis. The other papers in this major section of the volume are of importance in understanding the development of knowledge in the biochemical anatomy of bone.

The last two sections consist of four and two papers respectively. The late Duncan McKeever's paper on "Intertrochanteric Fractures" is of clinical interest, and relates to articles in Section I in many ways, including those on "Age Changes in Human Bone" and "Epidemiology of Fracture in Aged Persons; A Preliminary Investigation in Fracture Etiology."

In summary, this issue of Clinical Orthopaedics is primarily devoted to scientific papers which are timely in summarizing the recent thoughts and facts related to physiology and pathology of bone. It should be familiar to the clinical orthopedist as well as to all interested in calcium and phosphorus metabolism as they relate to bone disease. Excellent illustrations, readable text, and good line graphs augment the material presented.

CAPT. ROBERT H. BROWN, MC, USN

COMPLICATIONS IN SURGERY AND THEIR MANAGEMENT. Edited by Curtis P. Artz, M.D., F.A.C.S.; and James D. Hardy, M.D., F.A.C.S. With contributions by 69 authorities. 1075 pp., 272 figs. W. B. Saunders Company, Philadelphia and London. Price $23.00.

This book is dedicated to our "Fathers in Surgery," Robert M. Zollinger and I. S. Ravdin. The editors state that "Nowhere could one find in a single volume a complete dissertation about complications—thus the need that provided the stimulus for this book."

Both the general complications surrounding all surgery and those specific operations (appendectomy, splenectomy, etc., etc.) are discussed. The experience of 69 authorities is called on and their advice set forth in the pages of the book. The editors, likewise, have taken part in the preparation of several chapters, in addition to their editorial supervision.

At the end of each section there are extensive references which are invaluable in the further study of the material presented should one wish to do so.

The plan of the book, the extensive coverage of the field of complications one may encounter in general surgery make this book as necessary as the instruments needed to do the surgery.

R.E.B.

TREATMENT OF CARDIOVASCULAR EMERGENCIES. By Aldo A. Luisada, M.D., and Leslie M. Rosa, M.D. 122 pp. (pocket size). McGraw-Hill Book Company, Inc., New York, Toronto, London. Price $4.95.

This small volume (pocket size, 122 pages) is described by the authors as suitable for the practitioner. It should fulfill this purpose handsomely for the interne, resident, general practitioner and internist. The chief defect is the price; $4.95 is a bit steep for this small book.

It is well organized, well indexed. The format includes an initial outline of the major category, e.g. "Coronary Attacks," subdivisions thereof; drugs, dosage, route of administration; complications and page references to their handling. There follows a more detailed, but still brief, description of the syndrome, physical diagnosis, characteristics, and therapeutic measures. Pharmaceutical and brand names are given.

Most unusual for such a treatise are the physiologic discussions of each emergency, lucid, simple, providing an intellectual explanation for the approach to each problem. Equally pleasing and unusual are the bibliographies which present the old masterpieces and recent significant commentaries.

Clinicians never agree totally, and there are

minor points that many would alter. Mephenteramine is preferred by many for mild shock in myocardial infarcts. Simplicity of administration, benignity of action, and frequent control of hypotension until an improving myocardium functions adequately, recommend this and similar drugs. The authors present a rather euphemistic view of levophed, neglecting the thrombophlebitis and soft tissue sloughs that sometimes attend its use. There is no mention of the intravenous administration of smaller doses of narcotics, which allow prompt relief of pain and apprehension, and avoid delayed absorption of accumulated drug.

All in all the book is valuable, interesting, well written. The authors are to be complimented.

LT. COL. R. B. FRANKLIN, MC, USA

CLINICAL CHEMISTRY. Principles and Procedures. 2nd Ed. By Joseph S. Annino, Clinical Chemist, Mass. Memorial Hospitals. 348 pp. Little, Brown and Company, Boston and Toronto. 1960. Price $8.00.

This handbook has been prepared to be used by medical technicians, clinical pathologists and students of clinical chemistry. It assumes that the user has a working knowledge of analytical chemistry. The first 74 pages are fundamental discussions of apparatus, standard solutions, principles of colorimetry, and a review of the methods used in quantitative analysis. This is followed by a brief discussion of the method of collection, preservation and identification of samples and with a table suggesting the normal range of values to be determined, more particularly in blood analyses.

The balance of the book discusses definite procedures for determination of CO_2, Cl, Na, K, pH, glucose, various forms nitrogen, Ca, P; then liver and kidney function tests, vitamins, enzymes, drug levels for sulfonamide, bromide, salicylate and barbiturates (but not alcohol). Attention is directed to analysis of the cerebro-spinal fluid. Each procedure is described in adequate detail; reagents outlined and calculations demonstrated. In those cases where there are a number of analytical methods, as for blood cholesterol, one method has been chosen from the many, although references are given to other procedures which have been or may be employed.

This is a useful textbook for laboratory use in clinical chemistry.

JAMES C. MUNCH

OUTLINE OF PATHOLOGY. By John H. Manhold, Jr., D.M.D., F.A.C.D., and Theodore E. Bolden, D.D.S., Ph.D. 340 pp. W. B. Saunders Company, Philadelphia and London, Price $4.75.

This book was written for the expressed purpose of filling the need for a specific text on pathology which was not too verbose and unwielding in weight as most standard textbooks and not as abridged as others to be incomplete. It certainly is concise and semi-abridged but all major points are at least mentioned although not commented upon in any great detail. For sake of brevity, all photographs and bibliography have been eliminated.

The book is divided into two parts. Part I consisting of an outline of two basic pathologic processes and Part II describing the more specific pathological processes as they apply to the organ systems.

I feel that the neophyte in pathology is the one who will profit more from this book than the graduate, although the authors cover their own particular field of oral pathology in a very competent manner.

CAPT. J. F. MCCABE, MC, USN

HORMONES IN HUMAN PLASMA. Nature and Transport. Edited by Harry N. Antoniades, Ph.D., 33 contributors. 667 pp. Little, Brown and Company, Boston. Price $25.00.

Dr. George Thorn, in his introduction to this book, remarks that it brings together a comprehensive account of a seriously neglected area in human endocrinology, the nature of the transported hormone and its carrier. The book is a well planned effort to present the present status of work in this area by the men who are doing the work. It deals with hormones from the pancreas, the pituitary, the thyroid, the placenta, the adrenal medulla and the steroid hormones. There is a commendable concentration on methods.

COL. WILLIAM H. CROSBY, MC, USA

EPIDEMIOLOGIC METHODS. By Brian MacMahon, M.D., Ph.D., D.P.H.; Thomas F. Pugh, M.D., M.P.H.; and Johannes Ipsen, C.M., Dr.Med., M.P.H. 302 pp. Little, Brown and Company, Boston and Toronto. Price $7.50.

At the very outset this provocative volume significantly defines epidemology as "the study of the distribution and determinants of disease prevalence in man." The authors are quick to point out that the distribution or descriptive aspect does "not indicate the unique component of the discipline."

Except for those in preventive medicine, microbiology and possibly pediatrics, epidemiology unfortunately continues to be regarded as a science which is concerned with the exotic diseases or spectacular events in medicine. And this in spite of the fact that it is one of the most unusually versatile and useful tools in understanding the development and natural history of disease.

As a science the root systems of epidemiology thrived in the soil of the infectious and epidemic diseases. But in more recent years, as its method, technique and tools were refined its horizons broadened and its applicability was clearly demonstrated to such non-infectious diseases as cancer, cardiovascular disease and mental illness. This, of course,

as the authors point out, called for "appreciable modification of methods, if not of principles."

This Harvard University School of Public Health team of epidemiologists (Ipsen is now at the University of Pennsylvania School of Medicine) have prepared an extremely useful and readable book. They present classic principles and concepts which are the core of the dynamics of disease in its natural state, namely, time, place, person by age, sex, ethnic group and geneologic factors. Methods of gathering and interpreting disease frequency data and disease classification are presented in readily understandable terms which require no special or appreciable statistical talent (although it comes in handy). The one minor criticism this reviewer must mention is the absence of a somewhat more dynamic approach throughout the book. But as a basic reference it is sure to be of value to physicians, medical students and others in the life sciences and related disciplines.

JOSEPH HIRSH, Ph.D.

DISC LESIONS AND OTHER INTERVERTEBRAL DERANGEMENTS. By E. J. Crisp, M.D., D.Phys. Med. (Lond.) 158 pp., illust. The Williams & Wilkins Co., Baltimore, exclusive U.S. agents. Price $3.75.

In this brief and modest little volume the author has undertaken to explain in a simple, informal manner the various measures which can be used, other than surgery, in the treatment of a variety of back ailments, often classed in a lump together as "slipped discs." He has quite correctly shown that disc pathology is only one of many causes for pain arising at any vertebral level. While he is a specialist in physical medicine, yet he does not insist that all herniated discs can be "replaced" by manipulation.

In the case of apophyseal capsulitis and spinal arthritis, pain and stiffness are most marked in the morning on arising. The symptoms may actually decrease with mild activity through the day. Lumbar extension is restricted and painful, and relief may be had by gentle flexing of the spine. Yet roentgenograms usually show disc narrowing as well as apophyseal arthritis. He feels that for the most part any patient whose backache is increased by bed rest and relieved by daytime activity will respond satisfactory to traction and manipulation. One chapter is devoted to a concise, well illustrated discussion of the various steps taken in manual and mechanical traction manipulation. The author is a strong advocate of *sufficient* bed rest in his regime of conservative treatment. There is only a brief discussion of the neurological implications of true disc lesions, arthritis, spurring, ligamentous change, and other such conditions.

Unassuming and with a bit of humor as it is, the book should nevertheless give the "operator" for all back disturbances some cause to stop and consider.

JOHN MARTIN, M.D.

OCCUPATIONAL DISEASES AND INDUSTRIAL MEDICINE. By Rutherford T. Johnstone, M.D., and Seward E. Miller, M.D. 482 pp., illust. W. B. Saunders Company, Philadelphia and London. Price $12.00.

The rapidly changing industrial environment and constantly increasing numbers of basic ingredients in industrial products make this book a most important adjunct to the practice of medicine.

This book has been purposefully and wisely divided into two parts. Part I was written specifically to define the broad principles of industrial medicine in easily understandable yet practical and philosophic approach. Although Part I is of greatest value to the physician entering the field of industrial medicine the treatment of the subject material is also most helpful to those physicians whose interest and practice is taking a decided trend in that direction. The section on Industrial Medicine and Insurance is very thorough and enlightening. Certainly a subject on which all physicians should have increasing knowledge.

Part II of the book covers in excellent and thorough detail all of the well known etiologic agents from noxious gases, hydrocarbons and the dusty trades to the more modern agents of synthetic resins, plastics, pesticides and ionizing radiation. Each chapter is well illustrated by photographs, charts and pointed case histories.

Each special subject is made more complete with the addition of a broad bibliography. The chapter on physical agents is most valuable from the standpoint of its applicability to military preventive medicine.

The Appendix contains the threshold limit values adopted in 1959 and the Annex includes the recommended tentative list suggested by the Annual Meeting of the American Conference of Governmental Hygenists of 1960. The Glossary of industrial terminology in common usage completes the text.

This volume of Occupational Diseases and Industrial Medicine is most valuable to medical specialists in this field, to toxicologists, industrial hygiene engineers and all those in the broad field of public health. It can also be recommended highly for those physicians in general practice, in industrial areas, for internists and other specialists seeing industrial medical problem cases.

COL. MAX B. MCQUEEN, USAF, MC

CELLULAR ASPECTS OF IMMUNITY. Ciba Foundation Symposium. Edited by G. E. Wolstenholme, O.B.E., M.B., M.R.C.P.; and Maeve O'Connor, B.A. 495 pp. Little, Brown and Company, Boston. Price $10.50.

This symposium, presented by 32 world-wide par-

ticipants including two recent Nobel Prize winners, was concerned with the cellular aspects of immunology. Twenty short papers were presented and each discussed by from one to fourteen of those present. Dr. Burnet believes that one generalization could be made, i.e., "that the immunologically competent cell, rather than the antibody, has become the central theme of immunology." The emergence of information which points to the lymphocyte as an important cell in this process has been established by data which show it may have any one of three morphological appearances, i.e., lymphocyte, histiocyte and plasma cell. Certain practical aspects of these studies indicate that antibodies can be formed by newborn infants. How much this information will change the present concepts of immunization technics only further experiments will reveal.

Such a symposium as this only tends to point out other areas of approach to the problems at hand. This was the case here in that there seems to be much more work needed in, for example, a critical study of the primary response in animals in detailed quantitative aspects; in developing certain approaches to the passive transfer of delayed hypersensitivity by cell fragments and the necessity of developing means of recognizing immunologically competent cells in a given cell population. The extension of the application of Puck's technic of cloning cells in tissue culture to the possibility of demonstrating immunological competence by these clones *in vitro* opens up unlimited fields of approach to the study of cellular immunity. Those approaches to these studies which have been made by the use of the fluorescent antibody technic are sound, and it is possible that this tool may be used to elucidate further problems as they arise.

This book offers much to those involved in research in this field and it is hoped that further symposia of this nature will be offered in the type of approach made here.

COL. WARREN C. EVELAND, U.S.A (Ret.)

PROGRESS IN THE TREATMENT OF FRACTURES AND DISLOCATIONS, 1950-1960. By Thomas B. Quigley, M.D., and Henry Banks, M.D. 102 pp. W. B. Saunders Company, Philadelphia and London. Price $2.50.

This small volume would have been better published in the *Journal of Bone and Joint Surgery* rather than in book form. It gives a quick and fairly effective review of progress in fracture treatment over the past ten years and has a useful bibliography of over 400 articles. The brevity of this review forces the authors to some rather sweeping conclusions and every orthopedist will disagree with some of these. The non-operative, non-reduction and early mobilization treatment of fractures of the dorsal-lumbar spine which has gained fairly wide acceptance since Nicoll's work in 1949 is not mentioned. Nor is the early weight bearing treatment of tibial shaft fractures which is in common usage in several military and a few civilian orthopedic services mentioned. The book is of interest to all involved in the treatment of fractures if only to give the readers a basis of comparison with their own views on current fracture therapy.

MAJOR PAUL W. BROWN, MC, USA

VISUAL AIDS IN CARDIOLOGIC DIAGNOSIS AND TREATMENT. A Monograph. Edited by Arthur M. Master, M.D., and Ephraim Donoso, M.D.; 23 contributors. 216 pp., illustrated. Grune & Stratton, New York and London. Price $10.00.

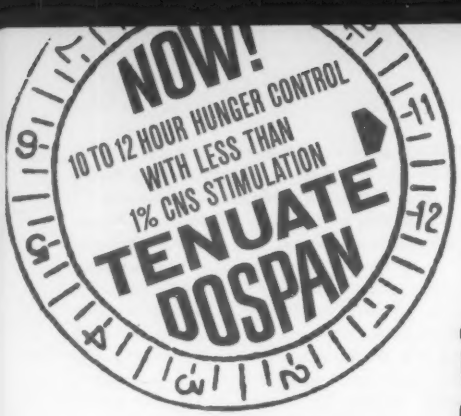
This new monograph is designed to acquaint physicians with present day techniques and graphic methods now available for the investigation of heart disease.

There are sixteen chapters written by twenty-three well known contributors. The subjects covered include the pathologic anatomy of surgically correctable congenital lesions, right and left heart catheterization, localization of shunts, angiocardiography, vectorcardiography, and phonocardiography. There are also chapters dealing with the fundamentals of open heart surgery pump oxygenators and related problems, the role of the anesthesiologist and the postoperative surgical and medical management of problems.

Phenomenal progress in this field is continuously being made and, therefore, any book such as this will not include some of the latest developments. A new modification of the technique of venous angiocardiography using a compressed air mechanical syringe injector (Gitlund) is an example.

While not encyclopedic in scope there are many factors and conditions ably covered in this book that are essential to physicians who advise or manage patients with certain types of heart disease.

COL. D. O. LYNN, MC, USA



JUNE 10: passed inspection but couldn't finish ten-mile hike.

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